



65TH CONGRESS  
2d Session }

HOUSE OF REPRESENTATIVES

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No. 584

ANNUAL REPORT OF THE  
COMMISSIONERS OF THE  
DISTRICT OF COLUMBIA  
YEAR ENDED JUNE 30, 1917

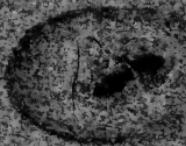
Vol. II

ENGINEER DEPARTMENT  
REPORT



WASHINGTON

1917



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ENGINEER DEPARTMENT  
REPORTS



WASHINGTON  
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1900

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**EXTRACT FROM REPORT OF THE COMMISSIONERS OF THE DISTRICT  
OF COLUMBIA FOR THE FISCAL YEAR ENDED JUNE 30, 1917.**

**OFFICE OF THE COMMISSIONERS  
OF THE DISTRICT OF COLUMBIA,  
Washington, November 15, 1917.**

*To the Senate and House of Representatives of the United States of America in Congress assembled:*

The Commissioners of the District of Columbia herewith submit for the information of Congress, pursuant to the requirements of section 12 of an act providing a permanent form of government for the District of Columbia, approved June 11, 1878 (20 U. S. Stats., 108), a report of the official doings of that government for the fiscal year ended June 30, 1917.

\* \* \* \* \*

**ROADWAY PAVEMENTS.**

The accompanying table shows the area in square yards of new roadway pavements laid and old roadway pavements resurfaced during the year, with the totals in square yards and miles of the various kinds of pavements at the close of the fiscal year:

*Comparative statement showing character and extent of roadway pavements.*

	Existing amount on June 30, 1916.		New pavement laid dur- ing the year (square yards).	Replaced with asphalt.	Existing amount on June 30, 1917.	
	Square yards.	Miles.			Square yards.	Miles.
Sheet asphalt and coal tar.....	3,007,952	159.42	56,754	.....	3,064,706	162.66
Asphalt block.....	603,261	30.59	.....	.....	603,261	30.59
Durax block.....	.....	.....	12,294	.....	12,294	.30
Asphaltic or bituminous concrete:						
On concrete base.....	78,708	4.58	.....	.....	78,708	4.58
On broken stone base.....	51,088	2.68	.....	.....	51,088	2.68
Cement concrete.....	68,655	3.75	26,532	.....	95,187	5.47
Granite block and rubble.....	444,822	23.93	.....	1 22,353	422,469	22.92
Vitrified block.....	25,535	1.34	.....	2 8,145	17,390	1.04
Cobble.....	68,799	3.31	.....	2,033	66,766	3.16
Macadam (estimated).....	1,961,304	122.78	23,455	36,389	1,948,370	122.64
Gravel and unimproved (traveled).....	.....	161.31	.....	.....	.....	159.57
Gutters on asphalt streets.....	217,032	.....	2,408	.....	219,440	.....
Gutters on asphaltic concrete streets.....	11,201	.....	.....	.....	11,201	.....
Pavements maintained by street railways.....	559,089	.....	.....	.....	559,089	.....
Total.....	7,097,446	513.69	.....	.....	7,149,969	515.61

<sup>1</sup> Includes 8,762 square yards of Durax block.

<sup>2</sup> Replaced with Durax block.

NOTE.—48,116 square yards sheet asphalt pavement replaced, including 21,412 square yards of asphalt surface laid on old base.

The sums appropriated for expenditures during the year under this head were as follows:

For paving new roadways and repairing old roadway pavements.....	\$725,250
For the construction and repair of suburban roads.....	476,110
For grading streets, alleys, and roads.....	25,000

Due to an unusually low bid for laying sheet asphalt pavements, no contract was made during the year for paving roadways with asphalt block, nor was any bituminous concrete laid. A limited amount of concrete roadway was constructed. A new type of roadway, the so-called Durax pavement, was laid on B street NW. from Seventh Street to Twelfth Street, consisting of small granite block paved on a concrete base with a mastic filler. This pavement, while expensive, was believed well adapted to the special traffic needs of this street, which is in the retail market district.

The prices paid under contract for roadway pavements during the year were as follows:

	Per sq. yd.
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base.....	\$1.44
Laying vitrified block with 6-inch concrete base.....	1.30
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder before compression), with 5-inch concrete base.....	1.40
Laying vitrified block with 5-inch concrete base.....	1.25

The prices for the fiscal year 1918 are as follows:

	Per sq. yd.
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base.....	1.76
Laying vitrified block with 6-inch concrete base.....	1.70
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 5-inch concrete base.....	1.69
Laying vitrified block with 5-inch concrete base.....	1.65

The current prices for resurfacing and repairing asphalt pavements under a two-year contract, which expires July 1, 1918, are as follows:

	Per sq. yd.
Laying sheet asphalt pavement (2½-inch asphalt surface, 2-inch binder, before compression), with 6-inch concrete base.....	\$1.51
Laying sheet asphalt surface (2½ inches before compression).....	.57
Laying asphalt binder (in connection with resurfacing work), per cubic foot.....	.24
Laying sheet asphalt surface for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot.....	.47
Laying asphalt binder for repairs, etc., within the space required by law to be kept in repair by street railway companies, per cubic foot.....	.39

Aztec and Bermuda asphalts were used by contractors in asphalt pavements laid during the year; Montezuma asphalt, in repairs and resurfacing of pavements; Trinidad and Texas asphalts, in proportions of 65 and 35 parts, in asphalt blocks made for use by the District.

Records of tests of various asphalts, and asphaltic mixtures, oils, sands, stone, and cements may be found in the report of the inspector of asphalts and cements.

#### SUBURBAN STREETS AND ROADS.

Large appropriations were made for expenditures during the year in extending the trunk highway lines outward from the city, among them being the following:

Massachusetts Avenue NW., Nebraska Avenue to the District line.....	\$40,000
16th Street NW., Montague Street to Alaska Avenue, including viaduct.....	90,000
New Hampshire Avenue NW., Grant Circle to Concord Avenue.....	16,000
Rhode Island Avenue NE., South Dakota Avenue to the District line.....	17,000
Naylor Road SE., Alabama Avenue to the District line (additional).....	5,500
Portland Street SE and SW., Nichols Avenue to the steel plant.....	40,500
Nichols Avenue SE., Fourth Street to Upsal Street.....	11,800

In these and other county roads and suburban streets for which appropriations were made there were constructed 21,531 square yards of cement roadway, 53,320 square yards of macadam roads and 11,226 square yards of paved gutter. The grading done in connection with this work aggregated 168,330 cubic yards.

In repairs to suburban roads the maintenance of trunk lines of travel required the greater part of the appropriation; \$25,000 was expended in maintaining eight of the more important roads in fair condition. This amount does not include the cost of oiling, which in all roads was approximately \$21,500. The winter was unusually wet, and the repairs necessary to be made in the spring cost more than usual. The appropriation was unequal to the demands made upon it, and as a result many of the roadways remained in a poor condition. The increased cost of labor and material was also the cause of a less amount of work being done. It is believed that, due to the causes above stated, the great increase in traffic, and the increasing area of roads necessary to be maintained, the appropriation for the construction and repair of county roads should be considerably increased.

#### MUNICIPAL ASPHALT PLANT.

The District of Columbia has operated a portable municipal asphalt plant in the repair of asphalt pavements and macadam streets for the past six years. During the year the plant was operated for 244 days, with a total output of 179,760 cubic feet, or an average of 737 cubic feet daily. Old material was used to a great extent in the manufacture of the output. Old asphalt topping removed from the streets in resurfacing is crushed to a finely broken product, to which new material is added.

The details of the cost of the operation of the plant are contained in the report of the engineer of highways. The cost of the product laid on the street is as follows:

Old material mixture.....	\$0.367
Asphaltic concrete mixture.....	.4341
Topping mixture.....	.4235

The total cost of minor repairs to sheet asphalt pavements during the year, representing the maintenance cost for the year, was \$43,853.82. This cost represents the maintenance of all sheet asphalt streets not under contract guarantee—a total yardage of 3,007,952. The cost by the square yard per year, about \$0.015, is unusually low by reason of the increase, by nearly 700,000 square yards, of pavements from but one to five years old, on which practically no repairs were needed.

#### SIDEWALKS AND ALLEYS.

The sum of \$240,000 was appropriated for paving sidewalks and alleys, and the sum of \$25,000 for constructing sidewalks and curbs around Government reservations, Government buildings, and parks. Sidewalks are paved with cement, under contract, and alleys are paved with vitrified brick or asphalt block and cement concrete. The amount of alley pavement laid during the year was 15,270 square

## VIII OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

yards of cement concrete, 20,989.58 square yards of vitrified block, and 3,365.63 square yards of asphalt block. One-half the cost of curb, sidewalk, and alley paving is assessed against abutting property, except public buildings and public reservations.

The contract prices for laying sidewalks during the year was as follows:

For large jobs adjoining paved streets, per square yard.....	\$0.96
For large jobs adjoining unpaved streets and for all small jobs, per square yard.....	1.17

For the fiscal year 1918 the prices are as follows:

For large jobs adjoining paved streets, per square yard.....	\$1.53
For large jobs adjoining unpaved streets, and for all small jobs, per square yard.....	1.71

The initiative in the matter of paving sidewalks and alleys is generally left with the owners of abutting property, the commissioners requiring a majority petition for such work before it is ordered. Exceptions are made, however, in cases where, on account of public danger or other public reason, the paving is demanded. The law requires the commissioners to advertise for two weeks their intention to lay sidewalks and curbs and to pave alleys and to give a hearing to the property owners affected. The work is ordered subsequent to such hearing when, in the opinion of the commissioners, it is necessary for the public safety, health, comfort, and convenience. The demand for this class of construction is constant, and increased appropriations for this work could advantageously be expended.

### BRIDGES.

Work of constructing a reinforced concrete viaduct in the line of Sixteenth Street across Military Road and a bridge platform and wall at the east end of the M Street Bridge across Rock Creek was commenced during the year and is now in progress. The contract price for the former is \$33,650 and for the latter \$8,724. The Connecticut Avenue Bridge across Rock Creek was repaved with asphalt, a portion of the work having been done during the fiscal year 1916 and the balance completed during the fiscal year 1917. The Aqueduct Bridge across the Potomac River was refloored, and the Pennsylvania Avenue Bridge across the Eastern Branch was painted during the year. Other minor bridges were painted and new floors placed thereon. On the Dumbarton Bridge across Rock Creek on the line of Q Street six bronze lamp-posts were erected in the center line thereof. A portion of the wall along Canal Road abutting the Chesapeake & Ohio Canal is in process of reconstruction at a contract price of \$21,144. An appropriation was made for the preparation of plans and specifications for a new bridge to replace the present Calvert Street Bridge across Rock Creek. The commissioners invited competitive designs and accepted the design of Mr. George O. Totten, jr., who was authorized to collaborate with the engineer of bridges in the preparation of plans and specifications for the new bridge. In the District appropriation act for the fiscal year 1915 an appropriation of \$110,000 was made for a viaduct across the railroad tracks at Benning, D. C., but this appropriation was found insufficient. An additional appropriation of \$35,000 was made in the deficiency act approved April 17, 1917; the work was again advertised, and the lower of alternate bids obtained was at an advance of 27 per cent over an earlier bid,

and exceeded the appropriations made by \$25,770. An additional appropriation of \$50,000 was made in the deficiency act approved October 6, 1917. Work was commenced on the plans for a wharf between M and N Streets SW., at the site of the old ferry landing. Fifty-five thousand five hundred dollars was appropriated for construction and repair of bridges and viaducts.

#### SURVEYOR'S OFFICE.

The work done by the surveyor is of two classes, namely, that done for private parties and that done for the District of Columbia and the United States. For the work done for private parties fees are charged in accordance with a schedule approved by the commissioners. The total amount of money collected for such work during the year was \$14,193.32. This is a slight decrease as compared with the previous year, but the number of surveys made was greater.

The surveys made for the District of Columbia and the Federal Government showed a considerable increase over that of the preceding year. The cost of this work based upon the schedule of fees would be \$9,807, but this is paid for out of the appropriation for the surveyor's office.

#### STREET AND ALLEY EXTENSION.

From the report of the assistant surveyor, District of Columbia, it appears that during the year 21 street, alley, and park condemnation cases were prepared and filed in court. Seventeen cases were confirmed during the year, and there are now pending in court 29 cases. Among the important street-extension cases filed during the previous year which were finally disposed of during the fiscal year 1917 were the opening of Thirteenth Street between Spring Road and Colorado Avenue, the widening of Georgia Avenue, the opening of Calvert Street and Cleveland Avenue, and the widening of Benning Road east of the Anacostia River.

A table appended to the report of the surveyor gives the status of all condemnation cases instituted by the District of Columbia where the proceedings have been begun or completed during the year.

#### TREES AND PARKINGS.

The number of trees planted along the curb in streets in the District of Columbia at the close of the fiscal year was 104,879, an increase of 573 over the previous fiscal year. The mileage of trees at the close of the year was 595.90, an increase of 3.26 miles over the preceding year. The mileage of tree-planted streets, figured on the basis of 352 trees to the mile, was 297.95 at the end of the fiscal year, an increase of 1.63 over the preceding year. The amount expended for the planting and care of trees during the year was \$57,779.73.

The E Street nursery, on Reservation No. 13 in the Washington Asylum grounds is well stocked. The stock in the nursery rows will furnish trees for street planting for from three to five years, but the location of the new municipal hospital on this reservation will demand the greater part of the ground used for nursery purposes. An arrangement effected with the board of charities, allowed the use

of ground previously used for nursery purposes on the west side of Iowa Avenue NW., immediately north and south of the line of Webster Street, and an additional piece to the west.

Provision should be made for permanent nursery grounds. The planting of trees is too intimately connected with the beautifying of the District to be dependent upon temporary sites for nurseries.

The District government lost a capable, faithful, and efficient superintendent of trees and parkings by the death of Mr. Trueman Lanham, November 11, 1916, after a service in that position of approximately 32 years.

#### STREET AND ALLEY CLEANING.

The street and alley cleaning division serves a population of nearly 400,000 and covers an area of approximately 70 square miles. It has charge of the cleaning of all streets, avenues, and alleys in the District of Columbia, except such work on the outlying county roads and suburban streets as is done under the supervision of the superintendent of roads. The work is not done by contract.

The expenditures for hand patrol work and machine washing represent over two-thirds of the total expenditures for street cleaning work. The area cleaned by this method has gradually been increased. If this area were considered a single street 30 feet wide, such street would approximate 212 miles in length.

The unit cost per thousand square yards of this work is as follows:

Hand patrol.....	\$0.145
Machine sweeping.....	.171
Alley cleaning.....	.371
Squeegeeing.....	.121
Flushing.....	.285
Machine flushing.....	.118

These costs all show an increase, due to increased cost of supplies and more especially of labor. The increased rate of pay effective September 1, 1916, has been in operation 12 months, against 10 the previous fiscal year.

The total cost of street cleaning, including all charges, except interest on investment and depreciation, was \$325,214.48. Based upon the 1915 census of a population of 357,749, this gives a per capita cost per year of \$0.909 as against a per capita cost the preceding year of \$0.831.

#### COLLECTION AND DISPOSAL OF CITY REFUSE.

Legislation was again unavailingly requested by the commissioners in their estimates for the fiscal year 1918 for authority to construct a municipal refuse plant. The present contracts expire on June 30, 1918. Bids were recently requested for the collection and removal of the various classes of refuse, and, as will be seen by the figures given below, the lowest bids have increased very greatly over present contract prices.

*Per annum prices.*

	Bid.	Present contract.	Collections of 1917.	Unit cost.
Garbage.....	\$143,400	\$69,840	1,44,603	\$1.56
Miscellaneous refuse.....	54,000	28,400	2,151,783	.19
As yes.....	78,300	60,000	2,149,810	.39
Dead animals.....	3,360	2,988	24,562	.12
Night soil.....	17,500	15,000	2,11,227	1.33

<sup>1</sup> Tons.<sup>2</sup> Cubic yards.<sup>3</sup> Barrels.

Details as to collections made and their manner and the manner of disposal and locations of disposal plants are given in the report of the superintendent of street cleaning.

New legislation is asked in the estimates for the fiscal year 1919, as follows:

The Commissioners of the District of Columbia are authorized to enter into contract or contracts for the collection and disposal of garbage and trash for a period not exceeding 10 years, beginning July 1, 1919, subject to annual appropriations by Congress under such conditions and specifications as they may prescribe: *Provided*, That such contract or contracts shall contain provisions that under the terms thereof there shall be constructed such disposal plants and transfer station or stations as may, in the judgment of the Commissioners of the District of Columbia, be necessary, in conformity with plans and specifications furnished by and under the supervision of the said commissioners, and that such disposal plants and transfer station or stations shall become the property of the District of Columbia at the termination of said contract or contracts: *Provided further*, That the garbage-disposal plant shall be located on property now owned by the District of Columbia in the subdivision of Blue Plains, in the District of Columbia, and the garbage transfer station or stations and trash-disposal plant shall be located on sites in said District which the said commissioners are hereby authorized to acquire by purchase or condemnation; and for the acquisition if such sites and the employment of such expert personal services as may be necessary in preparing detailed plans and specifications for the necessary disposal plants and transfer station or stations there is hereby appropriated, to be immediately available, the sum of \$70,000.

#### BUILDING OPERATIONS.

The estimated value of building construction, including repairs, during the year, and not including buildings under construction by the Federal Government, is \$15,613,075, an increase over the preceding year of \$2,117,540.

The number of permits issued for buildings, building repairs, awnings, signs, engines, motors, etc., was 5,583, a decrease of 215 under the preceding year. The total number of new buildings constructed during the year was 1,436, a decrease of 403 under the preceding year. Of these, 821 were dwellings, a decrease of 528 under the preceding year; 44 were apartment houses, a decrease of 16 under the preceding year; and 571 were business buildings, an increase of 141 over the preceding year. The permits issued for repairs to buildings were 3,226, a decrease of 10 under the preceding year.

The distribution of the cost of these buildings, including repairs, is as follows:

	Buildings.	Repairs, etc.
Northeast.....	599,750	\$81,238
Southeast.....	148,860	67,705
Northwest.....	6,309,552	1,475,271
Southwest.....	48,060	33,090
County.....	6,371,716	446,358
Total.....	13,477,938 2,103,662	2,103,662
Sum total.....	15,581,600	.....

<sup>1</sup> Does not include awnings, fire escapes, or signs, the values of which are estimated.

It is estimated that there are 64,648 brick buildings and 26,709 frame buildings in the District of Columbia. Of the brick buildings 1,177 were erected during the year and 119 razed. Of the frame buildings 259 were erected during the year and 126 razed.

Permits for buildings are issued upon the payment of fees, which are designed to cover the cost of the operation of the building inspector's office. The fees collected during the year were, however, due to a falling off of building operations, \$3,208 less than the cost of the operation of this office. While there was a decrease in the number of permits issued, the value of the buildings was \$2,000,000 greater than the previous year, as the permits were issued for a greater number of larger and more expensive buildings.

Under date of June 1, 1917, a new edition of the building regulations was printed.

#### CONSTRUCTION OF MUNICIPAL BUILDINGS.

During the year 11 buildings were under construction, as follows:

Building.	Location.
Powell School, No. 157.....	School Street, opposite Lamont Street NW.
Elizabeth V. Brown School, No. 113.....	Chevy Chase, D.C.
Fish Market.....	Water Street, between Eleventh and Twelfth Streets SW.
Third shelter, Farmers' Produce Market.....	B Street, between Tenth and Twelfth Streets NW.
Public convenience station, No. 4.....	Maryland Avenue, Fifteenth and H Streets NE.
Central garage.....	D Street, between Thirteenth and Thirteenth-and-a-half Streets NW.
Garage for health department.....	South Capitol and I Streets SW.
Street cleaning department sheds.....	Square between Thirteenth, Fourteenth, E, and F Streets, SE.

In addition to the above buildings, modifications were made in the New Central High School, Clifton Street between Eleventh and Thirteenth Streets NW.; the Dunbar High School, First Street between N and O Streets NW.; and a greenhouse was erected at the J. O. Wilson Normal School at Eleventh and Harvard Streets NW.

Plans and specifications for all buildings for which appropriations had been made were completed within the fiscal year with the exception of those for the municipal lodging house, the Eastern High School, and the Woodridge and Langdon School Buildings. Preliminary plans have, however, been made for the Eastern High School and final plans are under consideration. It should be borne in mind that estimates for buildings are made about one year in advance of the appropriations therefor, and 18 months or more in advance of advertisement for bids.

Owing to the increased cost of labor and material within the last 18 months the bids for the construction of 11 buildings overran the funds available from 20 to 40 per cent. In consequence the alteration work at the Central High School and the public convenience station at Fifteenth and H Streets were constructed directly under the supervision of the municipal architect. In other instances deficiency appropriations had to be asked, and in still other cases the buildings have not yet been constructed. Besides the high cost of labor and materials, the scarcity of laborers and mechanics has been a serious obstacle to the progress of the work. Specifications and proposals were prepared for 132 items and the work advertised.

#### REPAIRS TO MUNICIPAL BUILDINGS.

All municipal buildings are kept in repair under the direction of the municipal architect. These include school buildings, engine houses, police stations, and the police-court building. They number about 300 in all. The repair shop, transferred to the supervision of the municipal architect by act of Congress in 1909, was remodeled during the year and arranged for the more systematic and orderly storage of the stock and materials. A new system of property accounting has been inaugurated, and the office force reorganized. The activities of the repair shop relate to about 300 buildings and grounds.

#### THE DISTRICT BUILDING.

The routine work incident to the care of this building includes operating a power plant; woodworking, paint, and electrical shops; blue-print and photo shop; printing shop; and the elevator and superintendence of watch and cleaning force. One thousand eight hundred and sixty tons of coal were consumed; 408,420 kilowatt-hours of current generated, of which 328,790 were consumed in lighting and 139,630 for power. Of the latter, 32,054 were consumed by the electrical department. One thousand and fifty-one orders for blue prints were completed at a cost of \$1,160.70; 172 orders for photographs cost \$600.60; and 620 orders for printing, \$4,772.51. One thousand five hundred and forty pounds of waste paper were sold for \$273.11. A deficiency appropriation of \$6,000 was made primarily for the purchase of coal.

#### STABLES.

The stables located at First and Canal Streets SW. are used by the plant of the disbursing officer, plumbing inspector, sewer department, part of the surface division, surveyor, and department of weights, measures, and markets; that in V Street between Sixteenth and Seventeenth NW. by that of the municipal architect, repair shop, part of surface division, and the engineer commissioner and assistants. Of the 86 employees, 5 are annual and 81 per diem. Fifty-three horses and 43 mules are used by the instrumentalities named. Details as to employment are given in the detailed report. The average annual cost for forage of an animal was \$177.60. It is very desirable that the First Street stables should be removed from this location so near the Capitol, but measures to this end are not now recommended, as other demands are more imperative.

WORKHOUSE AND REFORMATORY.

In accordance with orders of the commissioners, all plans, etc., available have been collected in the office of the municipal architect; and a layout of the grounds and buildings was prepared and submitted to the penal commission and the commissioners. A constructing engineer, appointed in October, 1916, has taken charge of the construction work, and reports weekly as to the progress on the work and as to the preparation of plans and estimates. His report is replete with details as to cost of work and of material manufactured at the institution.

PLUMBING AND PLUMBING INSPECTION.

During the year the plumbing office made 35,189 inspections, a decrease under the preceding year of 553. It is estimated that the total cost of new plumbing work installed in private buildings during the year was \$1,111,818, and the estimated value of repairs and remodeling work on old plumbing is \$375,824. The average number of inspections per day per man of the field inspection force was 14½. Twenty-one cases of violations of the plumbing regulations were prosecuted in the police court.

Under the compulsory drainage act 32 cases were forwarded by the health department and other branches of the District Government for the installation of sewer and water in those instances where the owner had failed to do the work after notice served upon him. In 11 of these cases the owner or agent subsequently installed the service, and in 8 cases the work was done by the District of Columbia and assessments therefor levied. Thirteen cases are now pending.

PLUMBING BOARD.

During the year the plumbing board held 24 sessions for examination of candidates for license as master plumber and gas fitter. The total number of applicants examined was 54. The number of original candidates was 14, of whom 2 passed and 12 failed. Of the 40 who had been previously examined for license, 12 passed and 28 failed.

INSPECTION OF STEAM BOILERS.

The number of steam boilers inspected by the inspector of steam boilers during the year was 516, including 4 for the United States and 65 for the District of Columbia. Two were condemned as unfit for further use. The compensation of this official is received from fees paid by the owners of the boilers. The total amount of fees reported by him during the year was \$2,235, and the expenses of inspection \$310, leaving a net compensation of \$1,925.

EXAMINATION OF STEAM ENGINEERS.

The board of examiners of steam engineers held 52 meetings and examined 120 applicants, of whom 39 were found competent and 81 incompetent. This board also conducted examinations of would-be automobile and motor cycle operators.

PUBLIC CONVENIENCE STATIONS.

The three public convenience stations located at Seventh Street and Pennsylvania Avenue, Thirteenth Street and Pennsylvania

Avenue, and Ninth and K Streets NW were operated during the year from 6 a. m. to midnight. The receipts from pay compartments amounted to \$3,060.91. A fourth station, at Fifteenth and H Streets NE., was completed by day labor within the appropriation, which bids for this work exceeded. Plans for a fifth station, at Eighth Street NW, south of F Street, are in preparation. Locations for other stations are under consideration.

#### STREET LIGHTING.

There are 19,240 street lamps of all kinds in the District of Columbia as follows:

Mantle gas.....	10,392
Electric arc:	
6.6-ampere magnetite.....	279
4-ampere magnetite.....	522
Electric incandescent:	
250-candlepower, series.....	4
100-candlepower, series.....	3,604
100-candlepower, multiple.....	98
60-candlepower, series.....	3,467
60-candlepower, multiple.....	321
4-glower Nernst.....	64
Street designation lamps:	
Gas.....	392
Electric.....	97
Total.....	19,240

This was a net increase during the year of 435 lamps. Of this increase, 320 are 100 and 60 candlepower series lamps and 148 are gas lights. Thirty-eight lights were discontinued, 35 replaced by other kinds, and 40 are lights on the Union Station Plaza, transferred to the jurisdiction of the United States Government.

Improved incandescent electric lighting was installed during the year in Maryland Avenue NE. from First to Fifteenth Streets; on the approaches to the Dumbarton Bridge over Rock Creek at Q Street; on the Pennsylvania Avenue Bridge over Rock Creek NW.; and on the Harvard Street entrance to the Zoological Park. This work involved the erection of 183 lamps, mostly of 100-candlepower each, and gave improved lighting to approximately 1.7 miles of streets.

#### LIGHTS ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District in maintaining lights along the respective rights of way of such companies is as follows:

Washington Terminal Co.—Motion for new trial by company following verdict in favor of District in amount of \$11,223.32 was denied and the case is now on the way to Court of Appeals.

A fourth suit against this company has been entered for \$11,087.58 for the period from September, 1914, to July, 1917, both inclusive.

Philadelphia, Baltimore & Washington Railroad Co.—The suit filed March 3, 1916, against this company for \$17,178.25 is on the calendar and practically awaiting outcome of the litigation against Washington Terminal Co.

## FIRE ALARM, TELEPHONE, AND TELEGRAPH SERVICE.

Three and eighty-eight one-hundredths miles of underground cable were installed during the year. The amount in service at the close of the year was about 144 miles. The aerial cable service at the end of the year was 5 miles. Twelve new fire-alarm boxes were placed in service during the year, making a total of 604. The total number of fire alarms received and transmitted during the year was 1,507, of which 107 were false. The total number of poles connected with street and steam railroads, telephone, telegraph, and electric light, and the District fire-alarm telegraph and telephone service was 18,594, of which 17,669 are line poles and 925 are guy poles. The number of permits issued by the electrical department for wiring during the year was 5,162, and the number of certificates issued 3,131. The fees paid to the collector of taxes for these permits and certificates and for the sale of copies of the electrical rules and regulations amounted to \$5,643.90. The total number of inspections made by the electrical inspectors was 11,864.

July 1, 1917, there were 1,244 telephones connected to the District system. A switchboard with 31 sets of instruments was installed in the New Central High School, and another, with 17 sets, in the Dunbar School.

The various connections and extensions to the District underground conduit system involved the construction, by the electrical department, of 11,942 feet (duct) of conduit and 22 manholes. There are 1,056 connections to this system.

## ANACOSTIA RIVER AND FLATS.

The total expenditure on the project for the reclamation and improvement of the Anacostia River and Flats from the Anacostia Bridge to the District line to June 30, 1917, as reported by the Secretary of War, under whose direction this work is being prosecuted, amounted to \$581,783.81. The amount of the appropriation obligated is \$225,000. The amount estimated for the fiscal year 1919 is \$272,000. The project is 22 per cent completed. The following work has been done: Dredging, 1,931,201 cubic yards; masonry sea wall completed, 9,376 linear feet; riprap placed, 130,267.1 cubic yards; amount of land reclaimed or partially reclaimed, 120 acres.

## PARKS.

The existing appropriation for the condemnation of small park areas required that these areas should be acquired under a limitation imposed by the sundry civil act of August 1, 1914, that they must be entirely surrounded by streets. Practically all of the available parcels have been exhausted.

Of the various larger areas of desirable acquisition that known as the Klinge Valley tract especially commends itself. Its purchase has been urged by successive boards of commissioners for at least seven years in one form or another. Its natural beauty appeals to those going through it, and it provides access to Rock Creek Park, independent of Zoological Park control, from Woodley, Klinge, and Reno Roads. The area which should be acquired is not great and will not interfere with the development of adjacent areas.

## ROCK CREEK PARK.

The jurisdiction and control over Rock Creek Park is placed by law under the Commissioners of the District of Columbia and the Chief of Engineers, United States Army, acting jointly. The amount appropriated for the care and maintenance of the park during the year was \$22,000. The only new construction undertaken during the year was to widen Beach Driveway for a total length of about 1,500 feet above and below Boulder Bridge, in order to provide for increased traffic. Most of the roads of the park were oiled and sanded during the year, and the balance of the funds were expended for general care and maintenance. Stone has been purchased and hauled for the construction of a driveway across the park along a line under study.

Plans for a comprehensive scheme of general improvement of the park are in course of preparation by qualified landscape architects, so that all money expended in new construction may be toward carrying out a definite plan.

## HARBOR FRONT.

The total amount received from the rental of wharves and river frontage placed by law under the direction of the commissioners was \$17,359.95, divided as follows:

Potomac River front.....	\$15,982.00
Anacostia River front.....	584.25
James Creek Canal.....	793.70
	17,359.95

The actual water frontage in the District of Columbia devoted to commerce, with the exception of canals, is about 2 miles. The total available water frontage is about 18 miles, of which about 8 miles is set aside for parks and purposes of the United States. The largest amount of wharf property under the control of the commissioners is along the Washington Channel. The total frontage along this channel is 9,275 linear feet, of which 4,675 linear feet, between the grounds of the War College and the south curb line of N Street, are under the control of the United States. Of the remaining 4,600 linear feet, 4,021 linear feet are under the jurisdiction of the commissioners and 559 linear feet, between Thirteen and Fourteenth Streets, has been designated by Congress as the site of the Federal central heat, light, and power plant.

Along the frontage under the control of the commissioners are located the harbor police station and dock of the harbor boat house and dock of the fire boat, the District morgue, the municipal fish wharves and market, and a District property yard. The balance of the frontage is leased to private parties, generally for terms of five years, the basis of rental being a net return of 4 per cent on the estimated value of the wharf property, with the requirement that the lessee shall make all improvements and repairs.

On account of the construction of a sewer along the east bank of James Creek Canal from N to P Streets lessees along this portion of the canal have been notified that their leases will not be extended in any case after October 1, 1917. Two leases have been made, however, for water frontage south of P Street. The Washington Brick and

## **XVIII OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.**

Terra Cotta Company, occupying a frontage on the west side of the Canal between O and P Streets, has not yet vacated.

There are now three new fish wharves and a wharf for a District property yard. An appropriation has been made for constructing a wharf at the foot of N Street SW. Wharf property generally is in bad condition and deteriorating rapidly; hence the need of an appropriation for additional construction.

### **CONDEMNATION OF INSANITARY BUILDINGS.**

The board for the condemnation of insanitary buildings held five meetings, issued orders for the demolition of 42 buildings, and the repair of 55 buildings. Of the buildings ordered to be demolished, 30 were located on streets and 12 in alleys. Of those ordered to be repaired, 35 were located on streets and 20 in alleys.

Since the creation of the board, May 1, 1906, it has examined 6,709 buildings, of which 2,082 were demolished and 1,592 repaired. Of the buildings demolished, 1,406 were located on streets and 676 in alleys. Of the buildings repaired, 1,072 were located on streets and 520 in alleys.

The estimated number of tenants required to secure other quarters through the action of the board in the demolition of buildings since the creation of the board is 6,022. The number of tenants benefited by repairs to buildings required to be repaired by the board is 5,266.

Other repairs have been made to buildings at the request of the board by many owners and agents without the necessity of serving formal notice upon them. Five cases were referred to the corporation counsel for legal proceedings.

### **SEWERS.**

It is beyond the scope of this report to detail the various drainage studies and plans in course of preparation and execution by the sewer department, and related physical data. Reference to the report of its superintendent will prove both interesting and instructive as to one of the principal essentials to the health and comfort of this community and other communities within its tidal range. An important branch of the work of the department is that relating to the preparation of permits for and supervision of the underground work of public-service corporations and others.

The length of main and pipe sewers constructed during the year was 15.39 miles. The total length of main and pipe sewers in the District of Columbia on June 30, 1917, was 717.37 miles, of which 142.93 miles are main sewers, and 574.44 are pipe sewers. The total cost of the sewage system to June 30, 1917, was \$13,569,830.21. The cost of the sewage disposal system to the same date was \$4,685,165.71, making a total cost of the complete system to June 30, 1917, \$18,254,995.92.

The final section of Rock Creek main intercepting sewer extending as far northward as Military Road, was under construction during the year. The final section of the Anacostia main intercepting sewer was partly constructed, and contract executed for constructing the first section of the Upper Potomac intercepting sewer.

## SEWER CONSTRUCTION.

The following table shows the length and cost of sewers constructed during the year:

Section.	Length.	Cost.
	Feet.	
1. County west of Rock Creek.....	12,519.23	\$25,478.70
2. County east of Rock Creek.....	19,920.02	74,628.59
3. County west of Anacostia River.....	11,379.44	24,159.44
4. County east of Anacostia River.....	19,437.06	66,437.44
5. Washington City.....	17,593.06	98,317.31

## SEWAGE DISPOSAL SYSTEM.

The sewage disposal system was in continuous operation throughout the year, pumping the sewage of practically the entire District, as well as storm water from the 900-acre low area along Pennsylvania Avenue. At the main pumping station 21,972,000,000 gallons of sewage and 357,000,000 gallons of storm water was pumped during the year. At the Poplar Point pumping station 452,000,000 gallons of sewage was pumped during the year. At the Woodridge pumping station 6,500,000 gallons of sewage was pumped during the year. Nine million seven hundred and forty-four pounds of coal were consumed in the operation of the stations.

The main sewage outfalls of the sewage disposal system, in the Potomac River about opposite Alexandria, were under observation throughout the year. The general condition of the river waters at and below the outfalls continued very good, and an examination of the river bottom failed to disclose any appreciable sludge deposits. The conditions, however, were less favorable than during the preceding year, evidenced by the decreasing oxygen content of the river waters in this vicinity. The average oxygen for July, 1917, was but 43 per cent, while for July, 1916, it was 78 per cent, and for May, 1917, it was 50 per cent, as against 73 per cent for May, 1916. The oxygen tests year by year indicate a progressive drop in oxygen sufficiently serious to demand attention. The limit of oxygen content in a considerable reach of waters is approaching the point where fish life will be seriously affected. The only remedy for this condition is the installation of sewage treatment works designed to remove sufficient organic matter from the city sewage as would maintain a constant in the amount of organic matter, depending solely for purification on dilution in the river waters. With the increase in population of the District of Columbia and the corresponding increase in volume of sewage discharged into the river, the limit in the capacity of the river to satisfactorily purify the sewage by natural processes is approaching nearer each year. It is important that treatment works designed to work in harmony with the advantageous natural conditions afforded for the disposal of sewage in the Potomac River be installed in the near future. As the design and construction of these sewage treatment works, involving the acquisition of the necessary land, will require a number of years, it is considered advisable in the interest of proper sanitation that initial steps be taken without delay toward the installation of these works.

## METROPOLITAN SEWAGE DISTRICT.

At the 1916 session of the Maryland Legislature an act was passed creating a sanitary district along the border of the District of Columbia and providing for the appointment of a commission to prepare plans and estimates for the sewage of this district, with instructions to report to the legislature meeting in January, 1918. The plans of this commission are, in cooperation with the plans of the District of Columbia, to relieve park streams within the District from pollution by domestic sewage from the Maryland towns bordering the District. These plans contemplate the connection of the Maryland sewers to the sewage system of the District of Columbia. Legislative authority has been granted the Commissioners of the District of Columbia to enter into agreements with the Maryland authorities toward this cooperation. The condition of these park streams where they enter the District of Columbia indicates an increase in pollution. Certain Maryland towns bordering the District have constructed sewage systems which discharge sewage directly into these streams. No steps in the way of actual construction have as yet been taken by the State of Maryland, but a State commission is now engaged in the preparation of plans for the Maryland intercepting sewers with a view to securing legislation by the State of Maryland toward remedying these conditions.

## WATER MAINS.

It is impossible in this condensed report to present the many noteworthy details and extent of the operation of the water department. These details will be found in important reports following this.

During the year 61,493 feet, or 11.6 miles, of water mains of various sizes were laid, making the total length of mains now in service 3,271,156 feet, or 619.6 miles. The working equipment of the pumping station has been increased by the installation of one 5,000,000-gallon centrifugal pumping unit and two boilers.

Several trunk mains are needed in the northwest section, in one locality in the northwest section, in the gravity service, most urgently, to furnish a supply with increased pressure. The estimated cost of those in this year's budget is \$618,532. The 20-inch third high-service trunk main from Georgia Avenue and Fairmont Street to Wisconsin Avenue and Woodley Road has been completed and is in service. The old 20-inch and 12-inch mains previously used in this service are now being used as reinforcement mains for the second and first high services. Survey was begun for the 12-inch second high trunk line from Thirty-seventh and Reservoir Streets through Reservoir and New Cut Road, to Conduit Road NW. The total pumpage for the year was 8,706,640,000 gallons, which is 84,670,000 more than in the year 1915-16. A total of 151.5 miles of mains, practically all 6 inches in diameter, were tested and a daily underground leakage of 273,500 gallons was found, an average of 1,800 gallons per day per mile of pipe. Four individual leaks were found, amounting to a joint rate of 275,000 gallons daily. Another great need is the covering of the Brightwood Reservoir, on Sixteenth Street NW., to prevent contamination of the water, which is filtered before reaching the reservoir. It is there exposed to dust, germs, and the formation of algae. The reservoir should be covered with a concrete slab in a manner similar to the Reno Reservoir, which was

covered during the present year. The cover over the Reno Reservoir has been laid out in tennis courts which were placed under the jurisdiction of the department of playgrounds. A similar use could be made of the cover proposed to be placed over the Brightwood Reservoir.

There are in service at the present time 3,499 fire hydrants, 229 public hydrants, 18 sanitary fountains, 153 horse fountains, 42 deep public wells, and 4 shallow public wells.

#### WATER CONSUMPTION AND WASTE.

The per capita consumption of filtered Potomac water increased during the year from 136.5 gallons to 139.3 gallons, with a total mean daily consumption of 51,454,000 gallons, as against 49,698,000 gallons for the preceding fiscal year. This consumption and avoidable use, for brevity we will call it waste, occurred notwithstanding the installation of water meters, which had progressed during the year to the extent of 85 per cent of the entire number of house services. The increase in per capita consumption is not due to private consumption, but entirely to use and waste of water by governmental institutions. It is estimated that waste in such large plants as the Government Printing Office, the State War and Navy Building, navy yard, and Bureau of Engraving and Printing is approximately 4,000,000 gallons per day. Reports made by the superintendent of the water department indicate that the Government Printing Office is using 3,940,000 gallons per day, the navy yard 5,000,000 gallons per day, and the Bureau of Engraving and Printing 1,234,000 gallons per day. A large portion of this water is unnecessarily used for condensing purposes. The attention of the Chief of Engineers of the United States Army, who is in direct charge of the water supply of the city, was called to this waste by the commissioners with a view to obtaining the cooperation of all departments concerned to conserve the water and prevent waste. It is understood that the attention of Congress will be called to the matter by the Chief of Engineers in his annual report for the fiscal year 1917. The completion of the central heating and power plant, now under construction by the United States Government, to furnish heat, light, and power to the various governmental buildings in the city of Washington will result in the saving of large quantities of water now used for condensing purposes, but this plant will not reach all of the governmental buildings, and may not be completed before January 1, 1919, or the following July.

Water surveys made during the year resulted in the detection of underground leakage from service pipes, mains, etc., of 1,752,800 gallons per day. A total of 151.5 miles of mains were tested, and the underground leakage due to street mains was found to be 273,500 gallons per day, or 1,800 gallons per day per mile of pipe. This leakage was due to defective lead joints. Complete data have not yet been compiled showing the total length of lead joints involved, but practically all the mains surveyed were 6 inches in diameter, with joints at 12-foot intervals.

It is well to further direct attention to the subject of waste. The cost for the last fiscal year of supplying water to the District is reported as \$2.45 per 100,000 gallons; of the pumping of this amount

for distribution purposes, \$0.535; a total cost of \$2.985. The waste in Federal buildings and plants is about 4,000,000 gallons daily. Were this reduced to 1,000,000, which is thought practicable, a saving in cost of supply and distribution amounting to \$89.55 daily, or \$32,685 yearly, could be effected. This is 4 per cent on \$817,150. An expenditure of this amount to bring about the possible saving of water would be a paying investment.

Let us look at this waste from another point of view. The engineer officer in charge of the water supply system reports that the safe daily capacity of the aqueduct system is considered to be 65,000,000 gallons; its maximum capacity 75,000,000. He further reports the average daily consumption for the fiscal year as 149 gallons per capita. At this rate a saving of 3,000,000 gallons daily would provide for an increase of 20,000 to the population. Again, a saving of 3,000,000 gallons daily is equivalent to approximately 8 gallons per capita, or a reduction of the daily per capita consumption to 141 gallons. At this rate the safe carrying capacity of the system would suffice for a population of 461,000. But it should not be overlooked that this capacity was exceeded on two days last year. From the various points of view the loss to the community by the avoidable use of water is evident. At present, hopes of a reduction in such use seem to rest only on the completion of the central heating and power plant. It may be found economical to provide a supply of water for industrial uses, with extensions for fire service along the lower water front, by direct pumping from the Potomac.

One thing is certain, until the supply of water for the use of the District is enlarged provision should not be made for the extension of the present system on a large scale to Fort Myer and elsewhere in Virginia. An appropriation for laying a 12-inch main for such extension is therefore not recommended.

#### WATER REVENUES AND EXPENDITURES.

The water revenues from all sources during the year, and balance of \$45,137.86 brought forward, amounted to \$980,153.27, plus \$3,083.83, transfer credits received by the auditor after the close of the fiscal year. The expenditures amounted to \$798,798.72. In addition to these expenditures there are outstanding obligations amounting to \$176,705.99, leaving an unobligated cash balance on June 30, 1917, carried forward to the credit of the water department for the fiscal year 1918 of \$7,732.39. The total cost of the work done by the water department during the year was \$660,700.65. The balance of the cash expenditure represented material purchased and stored. Of the total cost of the work done during the year, 44.6 per cent was for new work, 38.8 per cent for operating expenses, 13.8 per cent for general repairs, and 2.8 per cent for replacements. Estimates submitted for trunk main projects amount to \$618,532. It is apparent that the water revenues will not suffice for these special needs and current expenses.

#### WATER METERS.

During the year there were installed 6,877 water meters, making the total number in use on June 30, 1917, 60,338. The average cost

of installing a meter in a private residence where the work is done by the District is \$13.45, including the cost of the meter, which is \$5.75. The average cost per meter for maintenance is \$0.25. The rate charged for water on metered services is 4 cents per hundred cubic feet for all used in excess of 7,500 cubic feet. The minimum charge to each premise, allowing the use of 7,500 cubic feet, is \$4.50 per annum. On unmetered services the rate for domestic purposes is charged according to stories and front feet. On all houses two stories high with a frontage of 16 feet or less the charge is \$5 per annum, and for each additional front foot or fraction thereof there is added 31 cents to the charges as computed above. For each additional story there is added one-third of the charges as computed above. For business premises not metered the rates vary from \$1 to \$25 per annum. Where the rate is \$25 or more a meter is required to be installed by the owner or occupant of the premises at his own expense. The amount of water rents collected under the flat rate system was \$110,173.86, and under the meter system \$523,648.99. For water used in building construction the receipts amounted to \$2,841.46, making a total of \$636,664.31. In addition to this amount the water revenues from other sources, such as water-main taxes, charges for taps, etc., brought the total receipts up to \$731,710.50. The estimated receipts for the fiscal year 1919 are \$715,000. The total number of water services at the end of the fiscal year was 70,475, of which 10,137 are not metered. The percentage of services metered is 85.

#### CHANGES IN PERSONNEL OF THE BOARD OF COMMISSIONERS.

By orders of the War Department, Lieut. Col. Charles W. Kutz was relieved from duty as Engineer Commissioner of the District of Columbia, and Brig. Gen. John G. D. Knight, U. S. Army, retired, was appointed as his successor. Gen. Knight reported for duty July 15, 1917, and took oath of office the following day.

The President of the United States appointed Mr. W. Gwynn Gardiner a Commissioner of the District of Columbia to succeed Maj. Oliver P. Newman, and Mr. Gardiner took his oath as commissioner October 9, 1917.

Very respectfully,

LOUIS BROWNLOW,  
JOHN G. D. KNIGHT,  
W. GWYNN GARDINER,  
*Commissioners of the District of Columbia.*

## ORGANIZATION OF THE ENGINEER DEPARTMENT, D. C.

Brig. Gen. JOHN G. D. KNIGHT, *United States Army, retired, Engineer Commissioner.*  
Lieut. Col. J. J. LOVING, *Corps of Engineers, United States Army, Assistant.*

### UNDER THE IMMEDIATE SUPERVISION OF THE ENGINEER COMMISSIONER.

#### RECORD DIVISION—

D. E. GARGES, *Chief Clerk.*

#### WHARF COMMITTEE—

DANIEL E. GARGES, *Chief Clerk, Engineer Department.*

D. E. MCCOMB, *Engineer of Bridges.*

RUSSELL DEAN, *Harbor Master.*

#### ROCK CREEK PARK—

L. R. GRABILL, *Assistant Engineer in Charge.*

#### ELECTRICAL DEPARTMENT—

WARREN B. HADLEY, *Electrical Engineer.*

#### ENGINEER DEPARTMENT STABLES—

J. W. BEALE, *Superintendent.*

#### DISTRICT BUILDING—

Lieut. Col. J. J. LOVING, *Superintendent.*

### UNDER THE IMMEDIATE SUPERVISION OF LIEUT. COL. LOVING.

#### HIGHWAYS (STREETS, ROADS, BRIDGES, ETC.)—

C. B. HUNT, *Engineer of Highways.*

##### Sidewalks and alleys—

H. N. MOSS, *Superintendent of Streets.*

##### Construction and maintenance of suburban roads—

L. R. GRABILL, *Superintendent of Suburban Roads.*

##### Construction and care of bridges—

D. E. MCCOMB, *Engineer of Bridges.*

#### STREET AND ALLEY CLEANING, COLLECTION OF GARBAGE, ETC.—

J. W. PAXTON, *Superintendent of Street Cleaning.*

#### ASPHALTS AND CEMENTS—

J. O. HARGROVE, *Inspector of Asphalts and Cements.*

#### SURVEYOR'S OFFICE (including street extensions)—

M. C. HAZEN, *Surveyor.*

#### TREES AND PARKINGS—

CLIFFORD LANHAM, *Superintendent of Trees and Parkings.*

#### PERMITS—

H. M. WOODWARD, *Permit Clerk.*

#### WATER DEPARTMENT—

J. S. GARLAND, *Superintendent.*

##### Water rates—

G. W. WALLACE, *Water Registrar and Chief Clerk.*

#### SEWER CONSTRUCTION AND MAINTENANCE—

ASA E. PHILLIPS, *Superintendent of Sewers.*

#### MUNICIPAL ARCHITECT—

SNOWDEN ASHFORD.

##### Repairs to municipal buildings—

HENRY STOREY, *Superintendent of Repairs.*

#### BUILDING INSPECTION—

MORRIS HACKER, *Inspector of Buildings.*

##### Plumbing plans and inspection—

A. R. McCONEGAL, *Inspector of Plumbing.*

##### Plumbing board—

P. C. SCHAEFER.

J. S. O'HAGAN.

SAMUEL TAPP.

##### Board of examiners of steam engineers—

E. F. VERMILLION.

H. BOESCH.

W. I. EVANS.

#### BOARD FOR CONDEMNATION OF INSANITARY BUILDINGS—

Lieut. Col. J. J. LOVING, *Assistant to Engineer Commissioner.*

Dr. WILLIAM C. WOODWARD, *Health Officer.*

MORRIS HACKER, *Inspector of Buildings.*

# REPORT OF THE OPERATIONS OF THE ENGINEER DEPARTMENT OF THE DISTRICT OF COLUMBIA.

## REPORT OF THE ASSISTANT ENGINEER COMMISSIONER.

### OFFICE OF THE ENGINEER COMMISSIONER

### OF THE DISTRICT OF COLUMBIA,

*Washington, D. C., October 1, 1917.*

SIR: I have the honor to transmit herewith annual reports, giving in detail the operations during the fiscal year ended June 30, 1917, of the surface and subsurface divisions.

Very respectfully,

J. J. LOVING,

*Major, Corps of Engineers, U. S. Army,*

*Assistant to the Engineer Commissioner.*

The ENGINEER COMMISSIONER  
OF THE DISTRICT OF COLUMBIA.

## REPORT OF THE ENGINEER OF HIGHWAYS.

*WASHINGTON, D. C., August 28, 1917.*

SIR: I have the honor to submit the following report of the operations of the engineer of highways for the fiscal year ended June 30, 1917: The total amount of funds appropriated by Congress and deposited by corporations and others for disbursement by the surface division aggregated \$1,677,995, of which \$240,000 was for paving sidewalks and alleys in all parts of the District; \$725,250 for paving new roadways and repairing old roadway pavements; \$476,110 for construction and repair of suburban roads; \$55,500 for construction and repair of bridges and viaducts; \$25,000 for grading streets and avenues; \$25,000 for sidewalks and curbs around Government reservations, buildings, and parks; \$131,135 was spent in repairing pavements disturbed by other branches of the District government and by various corporations and others.

*Summary of work under appropriation for improvements and repairs for year ended June 30, 1917.*

Character of work.	Streets and avenues.	Suburban roads and streets.	Repairs to asphalt pavements.	Total.
Sheet asphalt pavement.....square yards..	32,904.43	23,789.41	26,734.38	83,488.22
Asphalt surface.....do.....			21,412.10	21,412.10
Vitrified block gutters.....do.....	2,429.79	1,748.33	3,232.42	7,410.54
Durax block (small granite block).....do.....	12,294.05			12,294.05
Cement concrete pavement.....do.....		26,531.76		26,531.76
Macadam roadway.....do.....		23,455.00		23,455.00
Cobble and granite gutters.....do.....		1,252.98		1,252.98
Cement gutters.....linear feet.....		4,194.03		4,194.03
Old pavement removed.....cubic yards.....			6,988.43	6,988.43
Old cobble and granite removed.....square yards.....	36,556.64	3,233.30		39,789.94
Granite and bluestone curb set.....linear feet.....	13,073.28	13,549.86	7,007.47	33,630.61
Cement curb formed and laid.....do.....			6,588.29	6,588.29
Curb reset.....do.....	7,762.26	8,525.41	10,542.62	26,830.29
Grading.....cubic yards.....	9,074.00	190,035.30	2,782.13	201,891.43
Sidewalks and curbs, under assessment and permit work.....square yards.....				66,347.52
Sidewalks and curbs, around Government reservations.....square yards.....				9,582.07
Sidewalks, whole cost.....do.....				20.00
Alley pavements, assessment work:				
Asphalt block.....				3,365.63
Vitrified block.....				20,989.58
Cement.....				15,270.00

SUMMARY OF WORK UNDER APPROPRIATION FOR IMPROVEMENTS AND REPAIRS FOR YEAR  
ENDED JUNE 30, 1917.

Due to the unusually low bid for sheet asphalt pavements, no streets were paved with asphalt block, nor was any bituminous concrete laid; this in continuation of our practice of a few years past. A limited amount of concrete roadways within the city limits was put down, as was done last year. A novel roadway type was laid on B Street NW. from Seventh Street to Twelfth Street, where small granite blocks were paved on a concrete base with a mastic filler, the so called Durax pavement. This pavement, while expensive, is believed well adapted to the special traffic needs of this street, which is in the retail-market section; and the type will be recommended for future use under like conditions. The work of constructing the Pennsylvania Avenue Bridge across Rock Creek, including the change of the tracks of the Capital Traction Co., from M Street Bridge to this structure was completed. The bridge crossing Military Road, in the line of Sixteenth Street NW., was placed under contract and is progressing satisfactorily.

Alley pavements were laid to the extent of 15,270 square yards of cement concrete, 20,989.58 square yards of vitrified block, and 3,365.63 square yards of asphalt block. All new sidewalks were of cement concrete, and a somewhat increased amount of concrete curb was placed in substitution for granite. Our unit costs have reflected the general conditions of increased prices for material and labor. Notwithstanding the well-known scarcity of both these, the year's work was advanced to substantial completion within the year. The appropriation bill was not approved until September 1, 1916, and contained several items of large amounts which required heavy grading followed by surface improvements, and the necessity for reasonable time for settlement of the new fills, together with the very brief working season after September 1, accounts for almost all of the incompletely completed work.

MUNICIPAL ASPHALT PLANT.

During the year the municipal asphalt plant was operated for 244 days with continued success, the total output of various products being 179,760 cubic feet, or an average of 737 cubic feet daily. The old material mixture is still used to a great extent, and it is found the cost of repairing by this method is economical. The crusher was operated for a total of 98 days during the year, the total output being 3,164 cubic yards. Both the plant and crusher are kept in good working condition, the maintenance and repair to the former being \$1,051.19, while that of the latter was \$114.38. Both of these costs, together with the overhead costs, are incorporated in the total cost of the output.

The following amounts of materials were purchased for use in manufacturing the output during the year:

Sand, 2,579.50 cubic yards, cost.....	\$1.16
Asphaltic cement, 499.94 tons, cost.....	18.10
Limestone dust, 210 tons, cost.....	2.63
Screenings, 935 tons, cost.....	1.27

There was purchased for use in operating the crusher and mixer the following large items:

Fuel oil, 28,396 gallons, cost.....	\$0.056
Coal, 150 tons, cost (average).....	5.48
Wood, 145 cords, cost (average).....	5.00

The costs of operation, including material and labor, are kept from day to day, and the summary of this data for the fiscal year develops the following unit costs for the year's operations:

OPERATION OF CRUSHER.

Period of operation, 98 working days; output of crusher, 3,164 cubic yards.	
Labor and fuel.....	\$2,320.17
Cost per cubic yard, \$0.733.	

Maintenance, renewals, and repairs.....	114.38
Cost per cubic yard, \$0.0361.	

Overhead costs:	
Capital invested, \$1,910, at 3½ per cent.....	66.85
Obsolescence, 5 years, at 20 per cent.....	382.00
Cost per cubic yard, \$0.1418.	

448.85

## Cost of crushed product per cubic yard:

Labor and materials.....	\$0.733
Repairs to plant.....	.036
Overhead.....	.142
	<u>.911</u>

## OPERATION OF PLANT.

Period of operation, 244 days; total output, 179,760 cubic feet.

## At plant:

Labor (3.99 cents per cubic foot).....	\$7,173.71
Fuel oil (0.82 cent per cubic foot).....	1,480.68
Coal (0.450 cent per cubic foot).....	784.88
Wood (0.20 cent per cubic foot).....	361.87
Binder stone (0.02 cent per cubic foot).....	45.00
Total (5.48 cents per cubic foot).....	<u>9,846.14</u>

## Haul from plant to street:

Labor (4.22 cents per cubic foot).....	<u>6,542.91</u>
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## On street:

Labor (13.78 cents per cubic foot).....	21,351.12
Painting joints (0.29 cent per cubic foot).....	441.64
Wood (0.20 cent per cubic foot).....	361.87
Total (14.27 cents per cubic foot).....	<u>22,154.63</u>

## Maintenance and repairs:

At plant (0.584 cent per cubic foot).....	1,051.19
On street (0.253 cent per cubic foot).....	<u>392.50</u>
Total (0.837 cent per cubic foot).....	<u>1,443.69</u>

## Overhead:

Capital invested, \$6,900 at 3½ per cent.....	241.50
Obsolescence, 5 years, at 20 per cent.....	1,380.00
Total (0.90 cent per cubic foot).....	<u>1,621.50</u>

## Supervision:

Foremen and overseers (3.51 cents per cubic foot).....	<u>6,317.50</u>
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## Total manufacturing costs per cubic foot:

	Cents.
Plant, labor.....	5.48
Hot haul.....	4.22
Street work.....	14.27
Maintenance of plant and tools.....	.83
Overhead—	
Interest and obsolescence.....	.90
Supervision.....	<u>3.51</u>
	29.21

The sand used was bought under contract at 49 cents per cubic yard and hauled from the wharf to the plant at a cost of \$1,739.13 for 2,579.5 cubic yards, or 67 cents per cubic yard, a total of \$1.16, per cubic yard. All other expendable material was delivered at the plant site at the costs thereof used herein.

The cost of a cubic foot of old material mixture from the above was as follows:

0.60 cubic foot old material, at \$0.91 per cubic yard.....	0.0202
0.34 cubic foot sand, at \$0.49 per cubic yard, haul \$0.67 per cubic yard.....	.0146
2.10 pounds limestone dust, at \$2.63 per ton.....	.0028
4.12† pounds asphaltic cement, at \$18.10 per ton.....	.0373
Cost of material.....	.0749
Manufacturing and placing cost.....	<u>.2921</u>
Total cost per cubic foot.....	<u>.3670</u>

† 10 per cent tare.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

## Asphaltic concrete mixture:

0.50 cubic foot screenings, at \$1.27 per ton (2,000 pounds).....	\$0.0321
0.50 cubic foot sand, at \$0.49 per cubic yard, haul \$0.67 per cubic yard.....	.0215
4.20 pounds limestone dust, at \$2.63 per ton.....	.0055
9.16 <sup>1</sup> pounds asphaltic cement, at \$18.10 per ton.....	.0829

Cost of material.....	.1420
Manufacturing and placing cost.....	.2921

Total cost per cubic foot.....	.4341
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## Topping mixture:

1 cubic foot sand, at \$0.49 per cubic yard, haul \$0.67 per cubic yard.....	.0430
4.20 pounds limestone dust, at \$2.63 per ton.....	.0055
9.16 <sup>1</sup> pounds asphaltic cement, at \$18.10 per ton.....	.0829

Cost of material.....	.1314
Manufacturing and placing cost.....	.2921

Total cost per cubic foot.....	.4235
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The total cost of minor repairs to sheet asphalt pavements during the year, the same representing the maintenance cost for the year, was \$43,853.82. This cost represented the maintenance of all asphalt streets not under guarantee by contractors—a total yardage of 3,007.952. The cost per square yard per year was therefore about 1.5 cents. For purposes of record and comparison the like annual costs are here stated for past years: 1908, 3.8 cents; 1909, 2.3 cents; 1910, 2.6 cents; 1911, 2.2 cents; 1912, 2.4 cents; 1913, 2 cents; 1914, 1.9 cents; 1915, 1.9 cents; 1916, 1.8 cents.

The municipal asphalt plant began operations in 1912, repairs being made by contract during the first quarter of that year and with the municipal plant during the last three quarters of the year and continuously since. The marked reduction for the year 1917 is affected very significantly by the law effective that year by which repairs to pavements over one year old is chargeable to repair appropriations instead of being paid for by the paving contractors under a five-year guarantee, as formerly. The yardage of pavement of which our repairs were distributed was thus increased by nearly 700,000 square yards, on which practically no expenditures were needed as the pavements were only from one to five years old.

My acknowledgements are due to the employees of this division for the work accomplished by the office during the year.

I transmit herewith the reports of the engineer of bridges, the superintendent of streets, and the superintendent of suburban roads.

Very respectfully,

C. B. HUNT,  
Engineer of Highways.

ASSISTANT TO ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA.

*Statement showing employees temporarily required in connection with street, road, and bridge construction and repairs, and appropriations and deposits from which paid during fiscal year ended June 30, 1917.*

## SURFACE DIVISION.

Designation.	Number.	Rate per diem.
Assistant engineers.....	3	1 at \$6, 2 at \$5.
Inspectors.....	14	12 at \$4, 2 at \$3.50.
Copyists.....	6	3 at \$3.50, 2 at \$3.
Computers.....	2	2 at \$5.
Overseers.....	2	1 at \$4.50, 1 at \$4.

## APPROPRIATIONS FROM WHICH PAID.

Improvements, seven repairs, District of Columbia, 1917.....	\$28,449.77
Construction of suburban roads and suburban streets, District of Columbia, 1917.....	4,625.80
Elimination of grade crossings.....	114.00
Pennsylvania Avenue Bridge across Rock Creek.....	112.00
<b>Total.....</b>	<b>\$33,301.57</b>

<sup>1</sup> 10 per cent tare.

## REPORT OF THE SUPERINTENDENT OF STREETS.

WASHINGTON, D. C., October 6, 1917.

SIR: I have the honor to submit herewith the annual report of the operations under my charge for fiscal year ended June 30, 1917.

Table H is a summary of work done under the appropriations for current repairs to streets, avenues, and alleys. The cost of such work was \$58,171.03, including repairs to 6,000 dangerous holes.

Table I is a list of work done under the permit system, wherein the property owners requested the improvement and paid one-half the cost, the District paying the other half. The cost of this work was \$18,662.07.

Table K is a list of work done under the assessment system. One-half the cost of such work is charged against the abutting property. The total cost was \$196,457.12.

Table L is a list of work paid for from the appropriation for replacing sidewalks and curbs around public reservations. The amount expended was \$14,125.10.

Very respectfully,

To the ENGINEER OF HIGHWAYS.

H. N. MOSS, Superintendent of Streets.

## REPORT OF THE SUPERINTENDENT OF SUBURBAN ROADS.

WASHINGTON, D. C., September 12, 1917.

*Construction of suburban roads and suburban streets.*—The year was marked by large appropriations for extending new trunk lines outward from the city, among them being the following:

Massachusetts Avenue NW., Nebraska Avenue to the District line.....	\$40,000
Sixteenth Street NW., Montague Street to Alaska Avenue, including viaduct.....	90,000
New Hampshire Avenue NW., Grant Circle to Concord Avenue.....	16,000
Rhode Island Avenue NE., South Dakota Avenue to the District line.....	17,000
Naylor Road SE., Alabama Avenue to the District line (additional).....	5,500
Portland Street SE. and SW., Nichols Avenue to the steel plant.....	40,500
Nichols Avenue SE., Fourth Street to Upsilon Street.....	11,800

Owing to the late date (September 1, 1916), on which the funds became available, and the large amount of very heavy grading required before any other work could be begun on the streets named above, none of these items could be completed within the fiscal year. All of the other items authorized were completed, except on several streets where condemnation of land was necessary; and work progressed satisfactorily on those named, after the contracts had been let, to the close of the year. Appropriations amounting to \$8,000 lapsed on account of the failure to acquire land, and work amounting to \$4,600 has not yet been begun, although it is under contract, by reason of the delay in condemnation proceedings. In view of these facts it is recommended that appropriations for suburban streets be made available until used.

There were constructed under the appropriations made about 21,531 square yards of cement roadway, 53,320 square yards of macadam roads, 11,226 square yards of paved gutter, in addition to which a total of about 168,330 cubic yards of grading was done.

The recently constructed concrete roadways are proving so satisfactory that this form of pavement will be used in the future wherever the conditions justify it.

*Repairs to suburban roads.*—The maintenance of trunk lines of travel required the greater part of this appropriation. The winter was unusually wet and the spring repairs were more costly than usual. The appropriation was unequal to the demands upon it, resulting in a poor condition of many of the roadways, except those newly built. The funds for repairs became entirely exhausted early in June, 1917, requiring the cessation of work at the season when it is most effective. In addition to this a heavy advance in the cost of labor and materials contributed to lessen the amount of work which could be done. Due to these causes, as well as to the great increase in traffic and to the large annual increase in the area of roads to be maintained, it is estimated that the appropriation made for the present fiscal year will not suffice to keep all of the suburban highways in fair condition, and an appropriation of not less than \$250,000 will be needed for this purpose for 1919.

The cost of maintaining in fair condition, as far as possible, some of the more important suburban roads for 1917 was as follows:

Canal Road.....	\$1,080.33
Connecticut Avenue.....	3,346.85
Massachusetts Avenue.....	2,825.87
Georgia Avenue.....	5,302.85
Rhode Island Avenue.....	2,828.87
Bladensburg Road.....	4,840.52
Benning Road.....	2,105.84
Nichols Avenue.....	2,845.72

The above amounts do not include the cost of oiling these as well as other roads which work cost approximately \$21,500.

The cost of labor and team hire has increased within the past year at least 40 per cent, as shown by the following rates:

Job No.		July 1, 1916.	July, 1917.
Common labor.		\$1.50	\$2.20
Common labor.		1.75	2.48
Skilled labor.		2.00	2.75 to 3.00
Teams.		4.00	5.44

Most materials have increased accordingly, except where covered by long contracts.

L. R. GRABILL,  
Superintendent Suburban Roads, District of Columbia.

#### THE ENGINEER OF HIGHWAYS.

#### Repairs to suburban roads, 1917.

Job No.	Location.	Work.	Cost.
<b>SECTION 1.—Potomac River to Rock Creek.</b>			
4017	McKinley Street NW., Board Branch Road to Thirty-second Street.	Repair.	\$495.91
4019	Canal Road, retaining wall.	do.	828.69
4031	Massachusetts Avenue NW., from Thirtieth Street to Wisconsin Avenue.	Patch.	2,300.74
4033	Forty-first Street, north of Yuma Street.	Repair.	134.81
4034	Idaho Avenue, between Wisconsin Avenue and Porter Street.	Cinders.	318.62
4036	Streets in Chevy Chase east of Connecticut Avenue.	Repair.	526.71
4051	Nebraska Avenue NW.	do.	24.50
4056	Little Falls Road.	Cinders.	921.74
4068	Idaho Avenue NW., between Woodley Road and Massachusetts Avenue.	do.	36.25
4078	Reservoir Street, between Thirty-fifth and Thirty-seventh Streets.	Tarvia.	84.32
4080	Massachusetts Avenue NW., between Idaho Avenue and Observatory Circle.	do.	525.87
4081	Reno subdivision.	Repair.	718.38
4089	Loughboro Road, between Nebraska and Wisconsin Avenues.	do.	188.75
4093	Newark Street NW., from Thirty-third Street to Connecticut Avenue, and Tilden Street from Connecticut Avenue to Rock Creek Park.	Oil.	541.02
4102	Powder Mill Road.	Grade and cinders.	33.75
4104	Rock Creek Ford Road, from Military Road to Rittenhouse Street.	Widen and repair.	3,240.79
4126	West side Thirty-fourth Street NW., between Macomb and Lowell Streets.	Granite-block gutter.	282.44
4128	Wisconsin Avenue NW., from Massachusetts Avenue to Belt Road.	Tarvia.	610.96
4131	Lowell Street NW., between Thirty-third Street and Wisconsin Avenue.	Repair.	60.50
4145	Twenty-ninth Street NW., Cathedral Avenue south.	do.	94.25
4149	New Cut Road.	Patch.	240.96
4191	Porter Street NW., between Connecticut Avenue and Thirty-sixth Street.	Repair.	958.49
4193	Stephenson Street NE., east of Broad Branch Road.	do.	131.23
4210	Canal Road NW.	Cleaning gutters.	316.50
4212	Broad Branch Road, between Livingston and McKinley Streets.	Repair.	442.90
4242	Belt Road, from Livingston Street to Chevy Chase Circle.	do.	324.08
4267	Thirtieth Street NW., between Albemarle and Brandywine Streets.	do.	325.24
4285	Loughboro Road, between Nebraska Avenue and Chain Bridge Road.	do.	239.01
4240	T Street N.W., between Thirty-fifth and Thirty-seventh Streets.	do.	195.50
4297	South side Canal Road.	Repair fence.	5.00
4317	Nebraska Avenue NW., between Wisconsin Avenue and Loughboro Road.	Repair.	323.99
4090	Ridge Road, between Nebraska Avenue and New Cut Road.	do.	\$18.80
4268	Albemarle Street NW., between Thirtieth Street and Tennyson town.	do.	361.30
4343	Tennison Street NW., between Thirty-second Street and Westfern Avenue.	do.	231.62
4359	Reno subdivision.	do.	102.81
4213	Streets in Chevy Chase.	Cinders.	200.75
4276	Tunlaw Road.	Repair.	399.37
4282	Ordway Street NW., from Thirtieth Street to Connecticut Avenue.	do.	162.75
4039	Section 1, various streets.	Oil.	2,420.18
4052	Foxhall Road.	Patch.	752.14
4053	Wisconsin Avenue NW.	do.	5,474.99
4054	Connecticut Avenue.	do.	3,346.85
4055	Newark Street.	do.	564.12

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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*Repairs to suburban roads, 1917—Continued.*

Job No.	Location.	Work.	Cost.
<b>SECTION I.—Potomac River to Rock Creek—Continued.</b>			
4070	Gordon's subdivision, Broad Branch Road and Thirty-second Street.	Repair.....	\$437.28
4077	American University Park, streets.....	do.....	852.82
4087	Streets in Chevy Chase, repair.....	do.....	1,325.11
4117	Broad Branch Road and Pleasant Drive.....	Patch.....	790.46
4118	Belt Road.....	do.....	180.20
4174	Nebraska Avenue NW., between Loughboro Road and end of macadam.	Repair.....	245.00
4182	Section 1, various streets.....	Tarvia.....	4,083.33
4228	Massachusetts Avenue NW., between Macomb and Nebraska Avenues.	Repair.....	522.56
4371	Rock Creek Ford Road and Rittenhouse Street.....	do.....	241.57
4385	Webster Avenue and Forty-first Street NW.....	Patch.....	26.50
4386	Massachusetts Avenue west of Thirtieth Street NW.....	do.....	1,028.75
4382	Section 1, various streets.....	Tarvia B.....	2,495.75
4038	Canal Road.....	do.....	1,200.82
4097	Belt Road.....	Patch.....	180.20
4118	Various roads.....	Watering.....	315.24
	Dangerous holes and minor repairs.....		9,198.59
			<u>53,441.76</u>
<b>SECTION 2.—Rock Creek to North Capitol Street and Riggs Road.</b>			
4097	Intersection of Rock Creek Church Road and Upshur Street.....	Curb and walk.....	492.21
4082	Tracy Place.....	Old material.....	70.31
4084	Vine Street between B. & O. R. R. and Maple Street.....	Cobble gutters.....	101.00
4088	Whittier Street and Eastern Avenue.....	Repair.....	44.00
4095	Shepherd Street NW., between Georgia Avenue and Eighth Street.....	Repair and gutters.....	681.95
4096	Longfellow Street, between Georgia Avenue and Shepherd Road.....	Repair.....	56.50
4105	Rock Creek Church Road, between Taylor and Webster Streets.....	Granite block gutters.....	716.50
4114	Blagden Avenue, from Sixteenth to Rock Creek Park.....	Patch.....	235.68
4115	Sixteenth Street NW., Piney Branch Road to Madison Street.....	do.....	90.74
4116	Colorado Avenue, Sixteenth to Madison Streets.....	do.....	77.59
4132	Summit Place NW., west of Ontario Apartment.....	Repair.....	66.63
4133	South side Varnum Street NW., between Rock Creek Church Road and Second Street.....	Gutters.....	40.94
4141	South side Buchanan Street, east of Iowa Avenue.....	do.....	98.25
4146	North side Hamilton Street NW., between Fourteenth and Piney Branch Road.....	do.....	110.75
4192	Dogwood Street NW., between Thirteenth and Fourteenth Streets.....	Repair.....	60.25
4195	Fifteenth Street NW., between Webster and Allison Streets.....	Cinders.....	44.50
4203	Upshur Street NW., between Fourth and Fifth Streets.....	Repair.....	53.75
4215	Saul's subdivision.....	do.....	999.45
4216	South side Harvard Street NW., west of Fifth Street.....	Cobble gutters.....	130.50
4227	Taylor Street and Illinois Avenue.....	Pave crossing.....	14.73
4275	Piney Branch Road from Decatur Street to Colorado Avenue.....	Cleaning gutters.....	76.75
4311	Quincy Street NW., Cedar Road to Thirteenth Street.....	Repair.....	93.87
4348	East side Grant Circle.....	Cinders.....	19.00
4334	Dogwood Street NW.....	Road machine.....	45.25
4108	Streets in Petworth.....	Repair.....	409.50
4057	Broad Branch Road, Rittenhouse to McKinley Streets.....	Remove and pile stone.....	101.38
4076	Streets in Takoma Park.....	Repair.....	812.27
4083	Kalma Street NW.....	do.....	259.41
4113	Georgia Avenue NW., from Rock Creek Church Road to District of Columbia line.....	Patch.....	2,951.46
4250	Blair Road, between Riggs Road and Cedar Street.....	Repair.....	552.38
4252	Rock Creek Church Road, between Harewood and Riggs Roads.....	do.....	52.75
4256	Riggs Road, between Rock Creek Church Road and District of Columbia line.....	do.....	201.85
4284	Iowa Avenue NW., between Georgia Avenue and Webster Street.....	Old material.....	210.62
4312	Shepherd Road NW., between Rock Creek Church Road and Georgia Avenue.....	Repair.....	170.00
4256	Macomb Street NW., east of Connecticut Avenue.....	do.....	105.50
4358	Gallatin Street NW., between Thirteenth and Fourteenth Streets.....	do.....	71.80
4368	Military Road.....	do.....	189.87
4381	Various roads, section 2.....	Oil.....	1,526.49
4304	Shepherd Road NW., Georgia Avenue to Fourteenth Street.....	Repair.....	106.50
4383	Section 2, various streets.....	Tarvia.....	3,250.00
4059	Georgia Avenue NW., Rock Creek Church Road to Kennedy.....	Tarvia B.....	308.90
4183	Various streets, section 2.....	Oiling.....	800.24
	Various roads.....	Watering.....	818.50
	Dangerous holes and minor repairs.....		9,801.60
			<u>27,122.14</u>

*Repairs to suburban roads, 1917—Continued.*

Job No.	Location.	Work.	Cost.
<i>SECTION 3.—North Capital Street to Eastern Branch.</i>			
4007	Mount Olivet Road NE., between Montello Avenue and Bladensburg Road.	Repair.....	\$341.56
4020	Thayer street NE., between Rhode Island Avenue and Twenty-fourth Street.	Cinders.....	197.00
4021	Irving Street NE., 400 feet west of Twentieth Street.....	do.....	91.50
4022	Bel Air Avenue NE., between Girard and Hamlin Streets.....	do.....	116.50
4023	Twenty-sixth Street NE., between Irving and Hamlin Streets.....	do.....	23.50
4040	Bladensburg Road NE.....	Repair.....	2,048.69
4041	Harewood Road.....	do.....	184.12
4042	Michigan Avenue NE., between North Capitol Street and District of Columbia line.....	do.....	1,174.30
4043	Lincoln Road NE., between V and Michigan Avenue.....	do.....	401.87
4045	Rhode Island Avenue NE., between Second and Twenty-fourth Streets.....	do.....	1,669.43
4063	Brentwood road, between Central Avenue and District of Columbia line.....	do.....	66.30
4065	M Street NE., east of Bladensburg Road.....	do.....	170.13
4069	Douglas Street NE., between Tenth and Twelfth Streets and Tenth Street between Rhode Island Avenue and Douglas Street.....	Cinders.....	693.68
4092	East side Lincoln Road NE., from entrance to St. Marys Cemetery south to alley.....	Gutters.....	331.50
4103	South side Lewis Street westward.....	do.....	53.50
4130	North side Hamlin Street NE., Twenty-fourth Street to Mills Avenue.....	do.....	191.06
4181	Section 3.....	Oiling.....	1,697.96
4194	West gutter of Thirteenth Street NE., north of Rhode Island Avenue.....	Repair.....	296.41
4197	Woodridge Street NE., at Thayer Street.....	Reconstruct sidewalk.....	377.99
4212	Douglas Street NE., between Twenty-second and Twenty-fourth Streets.....	Cinders.....	90.00
4238	Fourth Street NE., Michigan Avenue to entrance to St. Pauls College.....	do.....	25.25
4241	Michigan Avenue NE., between North Capitol Street and District of Columbia line.....	Repair.....	83.25
4283	Brentwood Road NE., Central to Eastern Avenues.....	Old material.....	203.62
4329	Harewood Road from scale house north.....	Repair.....	80.37
4330	Lincoln Road from V Street to Michigan Avenue.....	do.....	64.50
4266	Sargent Road NE., from Michigan Avenue to District of Columbia line.....	do.....	150.74
4064	Brightwood Park.....	do.....	485.00
4094	Benning Road NE., from end of asphalt to Benning.....	Patch.....	1,070.12
4388	Hamlin Street NE., Sixteenth to Seventeenth Streets.....	Cinders.....	42.75
4061	Various streets in Langdon.....	Repair.....	256.61
4319	Twelfth Street NE., between Monroe and Michigan Avenues.....	do.....	65.93
4387	Twenty-second Street NE., between Lawrence and Otis Streets.....	do.....	12.50
4349	Orrin, Staples, and Morse Streets NE.....	do.....	23.75
4404	Bates Road NE., Brookland Road to Sargent Road.....	do.....	93.25
4331	Rhode Island Avenue NE., Second Street to South Dakota Avenue.....	do.....	1,159.44
4369	Michigan Avenue NE., between North Capitol and Eighteenth Streets.....	do.....	1,237.17
4060	Various streets in Brookland.....	do.....	877.75
4214	Vista Street NE., between South Dakota Avenue and Central Avenue.....	do.....	191.18
4263	Bladensburg Road, between Levis Street and District of Columbia line.....	Patch.....	2,791.83
4378	Various roads.....	Oil.....	4,302.21
4248	Intersection of Cedar and Carroll Avenues.....	Reset curb.....	52.04
	Watering roads.....		319.87
	Dangerous holes and minor repairs.....		5,409.10
			29,215.13
<i>SECTION 4.—East and south of Eastern Branch.</i>			
4008	Intersection Fourteenth and S Streets SE.....	Terra-cotta pipe.....	269.21
4018	Sterling Street SE., between Niehols Avenue and Brothers Place.....	Repair.....	150.78
4024	Raleigh Street SE., Seventh to Niehols Avenue.....	do.....	251.72
4025	Alabama Avenue and Congress Road, between Wheeler Road and Seventh Street and between Alabama and Niehols Avenues.....	Gravel.....	206.30
4027	South side of V Street SE., between Sixteenth and Fendall Streets.....	Terra-cotta pipe.....	116.91
4032	West Street SE., south of Morris Road.....	Cinders.....	61.50
4066	Niehols Avenue SE., at Culvert.....	Granite block.....	205.37
4085	Tenth Place SE., alley to Savannah Street.....	Gravel.....	57.25
4086	Bowen Road.....	do.....	696.08
4107	Congress Heights.....	Cleaning gutters.....	202.01

*Repairs to suburban roads, 1917—Continued.*

Job No.	Location.	Work.	Cost.
<b>SECTION 4.—East and south of Eastern Branch—Continued.</b>			
4109	Fifty-eighth Street NE., between Dix and Foote Streets.....	Repair.....	\$105.37
4110	Ninth Place SE., Alabama to Savannah Avenues.....	Gravel.....	22.75
4124	Thirtieth Street SE., south of Pennsylvania Avenue.....	Terra-cotta pipe.....	45.48
4134	Thirty-third Street SE., between Pennsylvania Avenue and B Street.....	Repair.....	18.01
4140	R Street SE., between Twenty-second and Twenty-third, and Twenty-third Street, between R and Naylor Road.....	Shape and cinders.....	94.50
4143	Kenilworth Avenue.....	Patch with macadam.....	601.52
4144	Hunt Place.....	do.....	125.81
4184	Various streets, Deanwood.....	Repair.....	115.25
4209	Pomeroy and Morris Streets.....	Adjust drainage.....	22.87
4211	S Street SE., Naylor Road to German Orphan Asylum.....	Repair.....	68.00
4218	Branch Avenue SE., between Pennsylvania Avenue and Bowen Road.....	Gravel.....	108.25
4226	Anacostia Road, between Minnesota Avenue and Benning Road.....	Repair.....	605.49
4228	Sixty-first Street NE., between East Capitol and Dix Streets.....	Cinders.....	26.25
4009	East side Chester Street, between Alley Place and W Street.....	Cobble gutters.....	214.63
4142	Good Hope Road, from Anacostia to Good Hope.....	Gutters.....	391.72
4229	Benning Road NE., east end of bridge to Benning.....	Patch.....	196.79
4231	Central Avenue NE., Benning Road to District of Columbia line.....	Repair.....	567.05
4255	Benning Road NE., Central Avenue to District of Columbia line.....	do.....	123.67
4296	Fifty-eighth Street NE., from car line on Dix Street, 500 feet north.....	Cinders.....	24.31
4320	Bowen Road SE., between Pennsylvania Avenue and District of Columbia line.....	Repair.....	506.72
4217	Twenty-third Street SE., between Minnesota Avenue and Taylor Road.....	do.....	74.37
4225	Naylor Road SE., between Minnesota Avenue and Good Hope Road.....	Gravel.....	268.93
4292	Fifty-seventh Street NE., from Linwood Place to Blaine Street.....	Cinders.....	74.03
4006	Ridge Road NE., from Downings Place to Bowen Road.....	Gravel.....	315.20
4029	Minnesota Avenue SE., between Pennsylvania Avenue and Good Hope Road.....	do.....	331.66
4190	Livingston Road SE., between Oxen Road and District of Columbia line.....	do.....	262.25
4265	Howard Road SE.....	Grade and cinders.....	261.69
4293	Pomeroy Road SE., 300 feet west of Morris Road.....	Cinders.....	27.10
4295	Fourteenth Street SE., between R Street and Good Hope Road.....	do.....	33.80
4332	Anacostia Road SE., between Pennsylvania Avenue and Benning Road.....	Repair.....	267.63
4264	Kenilworth Avenue NE., between Benning Road and Kenilworth.....	do.....	169.74
4298	Alabama Avenue SE., from Wheeler Road to Naylor Road.....	Gravel.....	445.97
4318	Geisboro Road SE.....	Repair.....	21.12
4340	Sheridan Avenue, Stanton Road, Barry Farm.....	do.....	218.25
4344	Nichols Avenue SE., between Sheridan Avenue and South Capitol Street.....	do.....	1,040.95
4346	Pennsylvania Avenue SE., from bridge to Branch Avenue.....	do.....	20.00
4118	Various roads, section 4.....	Oil.....	978.97
4379	Benning Road NE., from Twenty-sixth Street to bridge.....	Repair.....	413.13
4028	Nichols Avenue, between Sheridan Avenue and Alabama Avenue.....	do.....	1,599.40
4347	Benning Road from bridge to Forty-second Street.....	do.....	302.13
4390	Hunt Place and Deane Avenue, between Minnesota Avenue and Forty-ninth Street.....	do.....	319.02
	Various roads.....	Watering.....	679.87
	Dangerous holes and minor repairs.....		6,624.21
			<b>19,990.99</b>

**RECAPITULATION.**

Section 1.....	\$53,441.76
Section 2.....	27,122.14
Section 3.....	29,215.13
Section 4.....	19,990.99

Miscellaneous.....	129,770.02
Outstanding bills.....	13,770.73
Balancee.....	6,335.28

Appropriation..... **150,000.00**

## REPORT OF THE ENGINEER OF BRIDGES.

WASHINGTON, D. C., August 28, 1917.

SIR: I have the honor to submit the following report of the operations under my charge for the fiscal year ended June 30, 1917:

The expenditures from the appropriation for the construction and repair of bridges were as follows:

Bridge No.	Character of work.	Cost.
30	Minor repairs.....	\$110.73
204	.....do.....	280.60
35	.....do.....	83.29
51	Pennsylvania Avenue Bridge SE. (Bridge No. 54), paint.....	2,054.32
207-208	Normanstone Drive, constructed reinforced concrete structures.....	948.84
35	M Street (Bridge No. 35), refloored.....	580.09
35	M Street, refloored space occupied by railroad company's tracks; whole cost to railroad company.....	537.83
35	M Street, making excavation back of east abutment.....	424.81
29	Congress Street, asphaltating portion of roadway.....	4,23.69
210	Normanstone and Park Drives, reconstructing culvert.....	627.87
7	Acqueduct Bridge, reflooring through and tower spans.....	2,056.31
117	Dumbarton Bridge, constructed center curbing of concrete, replaced lamp bases, removed old iron posts, and erected bronze standards.....	684.37
25	Linnean Hill Road, constructed revetment walls on south side.....	124.33
1	Chain Bridge, painting a portion of bridge.....	433.33
117	Dumbarton Bridge, erecting brace extension of wing walls.....	22.61
	Constructed inspector's portable office.....	40.68
		13,280.10
	Dangerous holes and minor repairs:	
	July 1-15, 1916.....	\$56.55
	July 16-31, 1916.....	47.07
	Aug. 16-31, 1916.....	9.90
	Sep. 1-15, 1916.....	21.30
	Oct. 1-15, 1916.....	6.75
	Oct. 16-31, 1916.....	2.25
	Nov. 1-15, 1916.....	139.53
	Nov. 16-30, 1916.....	24.25
	Dec. 1-15, 1916.....	1.44
	Dec. 16-31, 1916.....	48.74
	Jan. 1-15, 1917.....	19.64
	Jan. 16-31, 1917.....	23.75
	Mar. 1-15, 1917.....	19.30
	Mar. 16-31, 1917.....	45.5
	Apr. 1-15, 1917.....	27.00
	Apr. 16-30, 1917.....	15.00
	May 1-15, 1917.....	8.64
	May 16-31, 1917.....	3.37
	June 1-15, 1917.....	3.21
	June 16-30, 1917.....	58.55
		581.99
	Contract entered into with Edward G. Gummel for reconstructing two culverts in line of sixty-first street, between Southern Avenue and Clay Street N.E. (Bridges Nos. 133 and 134), contract No. 6312, on cost plus 10 per cent basis; estimated cost.....	4,000.00
	Hire of buggy and horse for Inspector G. B. M. Ricker.....	281.21
	Printing.....	12.18
	Tools.....	138.96
	Coal.....	28.80
	Salaries, engineer of bridges' office.....	2,676.25
	Lumber.....	999.05
	Miscellaneous.....	2,572.74
	Less overhead expenses.....	\$48.89
	Less lumber purchased from previous appropriations.....	479.93
		528.82
	Total net expenditures.....	24,042.46
	RECAPITULATION.	
	Appropriation.....	22,000.00
	Repayment by railway company.....	633.41
	Repayment by War Department (Bridge No. 7).....	2,056.31
		24,689.72
	Total net expenditures.....	24,042.46
	Balance.....	647.26
		24,689.72

The following bridges were repainted: Bridge No. 54, Pennsylvania Avenue SE.; Bridge No. 1, Chain Bridge—a portion of bridge was painted when fiscal year ended.

The following bridges were refloored: Bridge No. 35, M Street across Rock Creek; Bridge No. 7, Aqueduct Bridge, through and tower spans.

The Connecticut Avenue Bridge (Bridge No. 29) was partially repaved with asphalt during the last fiscal year and the balance was completed under contract No. 6171 with Cranford Paving Co.

Two culverts in line of Normanstone Drive, in Massachusetts Avenue subdivision (Bridges Nos. 207 and 203), were replaced by two reinforced concrete structures at a cost of \$948.84.

The culvert at Normanstone and Park Drives (Bridge No. 210) was replaced by a reinforced concrete structure at a cost of \$627.87.

Two small revetment walls were erected at the south end of Bridge No. 25, Linnean Hill Road crossing Piney Branch, at a cost of \$124.33.

A central curbing of concrete was placed upon the Dumbarton Bridge (Bridge No. 117). Two additional granite lamp bases were secured and six bronze lamp-posts were erected in the center line of the bridge.

Reinforced concrete steps were erected in Garfield Park SE. by W. H. McCray under contract No. 6154. The work was done under the supervision of this office and paid out of the appropriation for the elimination of grade crossings. Work was commenced September 7, 1916, and completed December 1, 1916. Cost, \$1,534.75.

A portion of the Anacostia River Bridge (Bridge No. 55) was repainted under work order No. 6002. Owing to the lack of funds the work was suspended May 19, 1917.

Contract No. 6187 was made with W. D. Murray & Co. for the reconstruction of a portion of the retaining wall on the south side of Canal Road NW.; contract price, \$21,144. The work is now in progress.

Contract No. 6261 was made with Charles H. Tompkins for the construction of a reinforced concrete viaduct in the line of Sixteenth Street across Military Road NW.; contract price, \$33,650. The work is now in progress.

Contract No. 6293 was made with Richard J. Beall for the construction of a bridge platform and wall at the east end of the M Street Bridge across Rock Creek (Bridge No. 35); contract price, \$8,724. The work is now in progress.

Contract No. 6312 was made with Edward G. Gummel for the construction of two reinforced concrete culverts in the line of Sixty-first Street, between Southern Avenue and Clay Streets NE. (Bridges Nos. 133 and 134.) These culverts will replace two wooden bridges in poor condition. The work is to be done on cost plus 10 per cent basis. The estimated cost of the work is \$4,000.

Benning viaduct: In the appropriation bill for the expenses of the District of Columbia for the fiscal year 1915 an appropriation of \$110,000 was made for the construction of a suitable viaduct and bridge to carry Benning Road over the tracks of the Philadelphia, Baltimore & Washington Railroad Co., and of the Baltimore & Ohio Railroad Co.

Legal proceedings to secure the necessary rights of way caused delay so that bids for the work were not requested until the latter part of 1916.

Bids were opened November 2, 1916, with the result that Snare & Triest Co. was the lowest bidder. Their bid was as follows: Design A, \$139,450; design B, \$134,150. All bids were rejected because the lowest one exceeded the amount appropriated for the work.

An additional appropriation of \$35,000 was made in the deficiency bill approved April 17, 1917, based upon the bids submitted and an allowance of 7 per cent for inspection and engineering. With the original appropriation \$110,000 and the appropriation in the deficiency bill for \$35,000 brought the total appropriation up to \$145,000.

The work was again advertised and bids were opened May 24, 1917, with the result that Snare & Triest Co. was the only bidder. Their bid was as follows: Design A, \$177,770; design B, \$170,770. Owing to the insufficiency of the appropriation it was necessary to reject this bid.

An appropriation of \$6,000 was made for the preparation of plans and specifications for a new bridge to replace the present Calvert Street Bridge across Rock Creek (Bridge No. 30). Under this appropriation work order No. 6025 was issued for making test pits to determine the character of the foundation material. This work was completed November 24, 1916, at a cost of \$354.12.

After competitive designs had been submitted a contract (No. 6232) was entered into with Mr. George O. Totten, jr., architect, to collaborate with the engineer of bridges, Mr. D. E. McComb, in the preparation of plans and specifications for the architectural features of the bridge; contract price, \$4,000.

## REPORT OF THE ENGINEER OF BRIDGES.

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	Coal.....	28.80
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	Miscellaneous.....	2,572.74
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	Less overhead expenses.....	\$18.89
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South Dakota Avenue: Work on the preparation of plans for a viaduct in the line of South Dakota Avenue NE., crossing the Baltimore & Ohio Railroad Co.'s tracks was commenced.

Wharf between M and N Streets SW: Work on the preparation of plans for a wharf on Water Street between M and N Streets SW. was commenced. This wharf will be located at the site of the old ferry landing.

Very respectfully,

D. E. McCOMB,  
Engineer of Bridges.

The ENGINEER OF HIGHWAYS.

TABLE A.—*Street Railroads in operation in District of Columbia June 30, 1917.*

Name of company.	Underground electric.		Overhead electric.		Total
	Double track.	Single track.	Double track.	Single track.	
Washington Railway & Electric Co.....	Miles. 23.09	Miles. 6.34	Miles. 26.77	Miles. 3.99	60 19
Capital Traction Co.....	20.19	3.50	3.57	.....	27.26
Washington & Virginia Co.....	.....	.46	.....	.....	.46
Fast Washington Traction Co.....	.....	.....	.....	.50	.50
Washington Interurban Co.....	.....	.....	.....	2.65	2.65
Washington & Maryland Co.....	.....	.....	.....	2.33	2.33
Total.....	43.28	10.30	30.34	9.47	93.39
Tracks used in common by Capital Traction Co. and Washington Railway & Electric Co.....	1.55	.....	.....	.....	.....
Tracks used in common by Washington Railway & Electric Co. and Washington & Virginia Co.....	.70	.....	.....	.....	.....
Total.....	45.53	10.30	30.34	9.47	95.64

TABLES B AND C.—*Character and extent of roadway pavements, July 1, 1917.*

SQUARE YARDS.

Section.	Asphalt.	Asphalt block.	Asphal-tic concrete, concrete base.	Asphal-tic concrete, stone base.	Cement concrete.	Durax block (small granite block).	Granite and rubble.
Northwest, city.....	1,747,335	26,455	9,674	6,372	1,218	12,294	122,509
Northeast, city.....	353,469	194,748	3,127	.....	.....	.....	18,289
Southeast, city.....	207,175	234,749	8,019	4,082	.....	.....	42,872
Southwest, city.....	246,212	38,222	13,535	.....	4,210	.....	167,912
Georgetown.....	149,676	23,075	4,144	905	.....	.....	39,881
Northwest, suburban.....	287,998	79,087	25,855	36,680	67,468	.....	23,945
Northeast, suburban.....	58,347	6,925	14,354	.....	17,291	.....	5,971
Southeast, suburban.....	14,494	.....	.....	3,049	5,000	.....	1,000
	3,064,706	603,261	78,708	51,088	95,187	12,294	422,469

Section.	Vitrified block.	Cobble.	Macad-am (estim-ated).	Gutters on asphalt streets.	Gutters on asphaltic concrete streets.	Pave-ments main-tained by street railroads.	Total.
Northwest, city.....	9,855	29,793	50,400	115,084	1,128	281,771	2,413,978
Northeast, city.....	3,882	82,200	28,540	231	69,316	753,802	.....
Southeast, city.....	13,122	53,800	14,679	898	48,328	627,724	.....
Southwest, city.....	3,138	11,233	29,000	22,383	1,254	56,820	593,919
Georgetown.....	515	12,618	4,000	5,220	498	31,816	272,348
Northwest, suburban.....	.....	1,330,862	23,020	5,871	54,668	1,935,454	.....
Northeast, suburban.....	.....	345,981	4,881	1,049	9,000	463,799	.....
Southeast, suburban.....	.....	32,127	5,633	272	7,370	88,945	.....
	17,390	66,766	1,948,370	219,440	11,201	559,089	7,149,969



TABLE E.—Statement of contract work on streets and avenues for year ending June 30, 1917.

Street or avenue.	From—	To—	Section.	Kind of pavement.	Date work completed.	Contract work.										Material.						Contract						
						Square yards.	Length.	Contract number.	Price per square yard.	Grading.	Old cobble removed.	Old curb removed.	Curb set.	Curb reset.	Vitrified block gutters.	Vitrified block.	8 by 8-inch curb.			6 by 20-inch curb.			Cost of material.	Cost of extra work.	Amount of contract.	Total cost of work.		
																Lin. feet.	Sq. yds.	Lin. feet.	Sq. yds.	Lin. feet.	Sq. yds.							
Pennsylvania, north side.....	Fifteenth.....	Bridge.....	Southeast.....	Asphalt.....	Dec. 17, 1916	3,100.94	898	6171	\$1.44	450	350.00	608.00	685.80	788.45	104.41	4,500	619.82	68.25	8648.42	.....	\$5,488.15	\$6,136.57	Crandford Paying Co.					
First.....	Maryland.....	Bridge Canal.....	Southwest.....	do.....	Mar. 10, 1917	2,202.15	809	6171	1.44	200	2,390.00	95.00	28.26	1,168.64	151.88	7,150	26.99	188.38	5,109.33	5,297.71	Do.	Do.						
Twenty-third.....	B.....	E.....	Northwest.....	do.....	Apr. 20, 1917	5,185.64	1,544	6171	1.44	2,981	46.00	2,671.67	164.59	372.49	16,067	2,604.47	73.79	2,457.50	10,868.66	13,326.16	Do.	Do.						
Twenty-seventh.....	L.....	K.....	do.....	do.....	Apr. 16, 1917	1,941.37	586	6171	1.44	554	{ 135.00 } 495.00	490.00	502.02	557.54	194.76	8,400	433.75	75.36	649.15	4,399.73	5,048.88	Do.	Do.					
Twenty-sixth.....	K.....	Virginia.....	do.....	do.....	Apr. 3, 1917	2,026.86	880	6171	1.44	347	{ 95.00 } 2,147.00	1,876.00	1,875.95	93.99	215.52	9,294	1,811.17	73.36	1,687.06	4,761.23	6,448.29	Do.	Do.					
Third, west.....	Pennsylvania.....	B, south.....	do.....	do.....	Apr. 17, 1917	5,141.78	1,306	6171	1.44	332	{ 5,366.00 }	20.62	2,771.76	314.82	13,872	22.01	337.19	11,755.82	12,063.01	Do.	Do.	Warner-Quinlan As.						
Teenth <sup>1</sup> .....	B.....	Pennsylvania.....	Northwest.....	do.....	May 21, 1917	98.05	116	5777	1.49	.....	.....	.....	19.87	8.00	.....	.....	20.34	1,589.38	1,600.72	Do.	Do.	Do.						
W.....	Eleventh.....	Florida.....	do.....	do.....	May 25, 1917	1,580.64	503	6271	1.44	535	{ 86.00 } 5,359.00	290.00	589.59	406.15	151.04	6,492	568.98	20.43	636.22	3,840.71	4,476.93	Crandford Paying Co.	Do.					
Seventh.....	R.....	do.....	do.....	do.....	May 31, 1917	4,102.89	1,264	6171	1.44	356	{ 2,4,490.64 } 2,344.64	2,344.64	85.15	301.59	12,850	2,330.00	29.32	2,129.84	10,511.72	12,641.56	Do.	Do.						
Twelfth.....	E.....	F.....	do.....	do.....	July 20, 1917	1,691.32	347	6171	1.44	345	{ 2,1,282.00 } 1,282.00	1,282.00	815.00	715.95	84.32	99.46	4,200	648.01	62.88	690.30	4,338.50	5,028.80	Do.	Do.				
B.....	Seventh.....	Twelfth.....	do.....	Small granite block.....	Aug. 10, 1917	12,294.05	1,600	6233	2.84	1,487	{ 16,907.00 } 550.00	1,600.00	1,168.00	761.34	21.44	950	925.65	258.47	1,480.27	\$5,410.03	40,075.04	46,965.34	Washington Asphalt					
I.....	North Capitol.....	First.....	Northeast.....	Asphalt.....	Apr. 25, 1917	2,762.85	838	6171	1.44	800	520.00	1,600.00	1,648.11	15.70	255.60	11,200	1,596.72	94.20	1,565.66	6,184.50	7,750.16	Crandford Paying Co.	Do.					
Second.....	II.....	I.....	Southeast.....	do.....	Aug. 10, 1917	1,348.00	407	6171	1.44	175	103.00	816.00	822.67	5.80	113.58	4,850	784.90	57.68	983.66	2,587.54	3,571.20	Do.	Do.					
Thirteenth.....	C.....	D.....	do.....	do.....	July 23, 1917	1,772.94	486	6171	1.44	512	440.00	.....	.....	858.83	110.33	4,700	152.75	.....	3,509.19	3,721.94	Do.	Do.						
				Total asphalt.....		32,964.43	9,984																					
				Total granite block.....		12,284.05	1,600																					
				Grand total.....		45,258.48	11,584																					

19720-17. (To face page 13.) No. 1.

<sup>2</sup> Granite block.<sup>3</sup> Asphalt block.

TABLE E.—Statement of contract work on streets and avenues for year ending June 30, 1917.

To—	Section.	Kind of pavement.	Date work completed.	Contract work.								Material.					Cost of material.	Cost of extra work.	Amount of contract.	Total cost of work.	Contractor.				
				Square yards.	Length.	Contract number.	Price per square yard.	Grading.	Old cobble removed.	Old curb removed.	Curb set.	Curb reset.	Vitrified block gutters.	Vitrified block.	8 by 8-inch curb.	6 by 20-inch curb.	Circular curb.								
Bridge	Southeast	Asphalt	Dec. 17, 1916	3,100.94	898	6171	\$1.44	450	350.00	608.00	655.80	788.45	104.41	4,500	619.82	68.25	\$648.42	.....	\$5,488.15	.....	.....				
Canal	Southwest	do	Mar. 10, 1917	2,202.15	889	6171	1.44	200	2,300.00	95.00	28.26	1,168.64	154.88	7,150	.....	26.69	188.38	.....	5,109.33	5,297.71	Cranford Paving Co.				
E.	Northwest	do	Apr. 20, 1917	5,185.64	1,544	6171	1.44	2,981	46.00	.....	2,671.67	104.59	372.49	16,067	2,604.47	73.79	2,457.50	.....	10,868.66	13,326.16	Do.				
K.	do	do	Apr. 16, 1917	1,941.37	586	6171	1.44	554	{ 2 135.00	490.00	502.02	557.54	194.76	8,400	.....	433.75	75.36	649.15	.....	4,399.73	5,048.88	Do.			
Virginia	do	do	Apr. 3, 1917	2,026.86	880	6171	1.44	347	{ 2 140.00	1,876.00	1,875.95	93.99	215.52	9,294	1,811.17	73.36	1,687.06	.....	4,761.23	6,448.29	Do.				
B, south	do	do	Apr. 17, 1917	5,141.78	1,306	6171	1.44	332	{ 2 147.00	.....	20.62	2,771.76	314.82	13,872	.....	22.01	337.19	.....	11,755.82	12,093.01	Do.				
Pennsylvania	Northwest	do	May 21, 1917	98.05	116	5777	1.49	.....	5,396.00	.....	.....	.....	19.87	890	.....	20.34	1,589.38	1,609.72	Warner-Quinlan Asphalt Co.						
Florida	do	do	May 25, 1917	1,589.64	503	6271	1.44	535	{ 2 86.00	290.00	589.59	406.15	151.04	6,492	568.98	.....	20.43	636.22	.....	3,840.71	4,476.93	Cranford Paving Co.			
F.	do	do	May 31, 1917	4,102.89	1,294	6171	1.44	356	{ 2 4,490.64	2,344.64	85.15	301.59	12,850	2,330.00	.....	29.32	2,129.84	.....	10,511.72	12,641.50	Do.				
Twelfth	do	do	July 20, 1917	1,691.32	347	6171	1.44	345	{ 2 1,495.00	815.00	715.95	84.32	99.46	4,200	648.01	.....	62.88	690.30	.....	4,338.50	5,028.80	Do.			
Twelfth	do	Small granite block	Aug. 10, 1917	12,294.05	1,600	6233	2.84	1,487	{ 2 1,282.00	550.00	1,168.00	761.34	21.44	950	925.65	.....	258.47	1,480.27	\$5,410.03	40,075.04	46,965.34	Washington Asphalt Block & Tile Co.			
First	Northeast	Asphalt	Apr. 25, 1917	2,762.85	878	6171	1.44	800	520.00	1,600.00	1,648.11	15.70	255.60	11,200	1,566.72	.....	94.20	1,505.66	.....	6,184.50	7,750.16	Cranford Paving Co.			
I.	Southeast	do	Aug. 10, 1917	1,348.00	497	6171	1.44	175	103.00	816.00	822.67	5.80	113.58	4,850	784.90	.....	37.68	983.66	.....	2,587.54	3,571.20	Do.			
D.	do	do	July 23, 1917	1,772.94	486	6171	1.44	512	440.00	.....	858.83	110.33	4,700	.....	.....	.....	152.75	.....	3,569.19	3,721.94	Do.				
	Total asphalt			32,964.43	9,984																				
	Total granite block			12,294.05	1,600																				
	Grand total			45,258.48	11,584			9,074	36,556.64	9,484.64	13,073.28	7,762.26	2,429.79	105.325	11,853.72	433.75	842.44	13,026.74	5,410.03	115,079.50	134,116.27				

<sup>2</sup> Granite block.<sup>3</sup> Asphalt block.

TABLE E-1.—Statement of contract work on suburban streets and roads for year ending June 30, 1917.

Street or avenue.	From—	To—	Section.	Kind of pavement.	Date work completed.	Contract work.										Material.						Cost of extra work.	Amount of contract work.	Total cost of work.		
						Square yards.	Length.	Contract number.	Price per square yard.	Grading.	Old cobble removed.	Curb set.	Curb reset.	Cobble or granite block gutters.	Vitrified block gutters.	Vitrified block.	8 by 8 inch curb.	6 by 20 inch curb.	Circular curb.	Cost of material.						
						Lin. ft.	Cu. yds.	Sq. yds.	Lin. ft.	Lin. ft.	Sq. yds.	Lin. ft.	Lin. ft.	Lin. ft.	Lin. ft.	18.82	17.21	199.70	8,480	8769.44	\$311.63					
Champlain...	Florida...	Kalorama...	Northwest...	Asphalt...	Dec. 30, 1916	2,510.27	816	6171	\$1.44	820.00	738.58	18.82	96.20	676.16	674.40	742.40	18.82	17.21	199.70	8,480	8769.44	\$311.63	\$5,085.01	\$5,854.44		
Connecticut Avenue Bridge...	South end...	do...	do...	Asphalt...	Dec. 20, 1916	2,227.20	525	6171	1.44	380.00	924.00	18.82	17.21	500	1,042.96	1,042.96	171.00	1,188.30	1,188.30	1,188.30	1,188.30	1,188.30	1,188.30	3,812.47	1,124.44	
Clifton...	Eleventh...	Thirteenth...	do...	Asphalt...	Dec. 5, 1916	2,194.70	712	6171	1.44	606.00	787.00	1,198.28	18.82	10,040	2,416.16	10,040	1,042.96	157.95	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	4,452.98	4,623.44	
Clifton...	Eleventh...	Thirteenth...	do...	Asphalt...	Jan. 1, 1917	2,194.70	747	6171	1.44	354.00	488.00	1,197.11	18.82	813.65	142.58	6,043	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	5,256.06	6,444.44		
Clifton...	Eleventh...	Thirteenth...	do...	Asphalt...	Dec. 6, 1916	1,867.31	615	6171	1.44	389.00	488.00	1,197.11	18.82	5,280	127.36	5,280	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	3,914.98	4,052.44		
Clifton...	Twelfth...	Thirteenth...	do...	Asphalt...	Dec. 11, 1916	1,325.88	430	6171	1.44	399.00	1,060.00	1,632.98	18.82	253.13	11,000	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	2,120.38	2,087.44			
Twenty-seventh...	Woodley...	Cathedral...	do...	Asphalt...	Apr. 30, 1917	2,606.23	843	6171	1.44	1,060.00	235.00	1,632.98	18.82	120.53	5,280	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	250.80	5,363.25			
Twenty-seventh...	Belmont...	Kalorama...	do...	Asphalt...	May 12, 1917	1,474.30	478	6171	1.44	343.00	1,200.00	1,632.98	18.82	958.87	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	140.62	5,363.25				
Twenty-seventh...	Fourth...	Fifth...	do...	Asphalt...	June 1, 1917	376.68	343	6171	1.44	146.00	288.00	634.87	18.82	36.31	85.81	3,500	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	1,042.96	587.12	5,363.25		
Connecticut...	Cathedral...	Klinge...	do...	Asphalt...	July 20, 1917	6,800.28	1,643	6171	1.44	1,498.00	2,241.88	813.24	18.82	399.85	16,333	2,134.55	119.25	2,171.49	2,171.49	2,171.49	2,171.49	2,171.49	2,171.49	12,619.75	14,791.44	
Princeton...	Georgia...	Rock Creek Church...	do...	Concrete...	May 15, 1917	1,270.12	377	6172	.89	205.00	45.45	65.58	18.82	18.84	17.90	18.82	18.82	18.82	18.82	18.82	18.82	18.82	18.82	18.82	1,926.31	1,941.44
Holmehead...	Otis...	Spring...	do...	Concrete...	June 2, 1917	2,253.88	674	6172	.89	455.00	1,165.16	69.67	18.82	1,160.46	1,160.46	1,160.46	3.24	908.60	1,160.46	1,160.46	1,160.46	1,160.46	1,160.46	2,766.82	3,670.44	
Perry...	Holmehead...	Spring...	do...	Concrete...	May 21, 1917	2,492.04	929	6172	.89	350.00	1,741.32	97.60	18.82	1,701.14	1,701.14	1,701.14	3.24	1,351.28	1,701.14	1,701.14	1,701.14	1,701.14	1,701.14	3,411.71	3,762.44	
Ward...	West of...	Mount Pleasant...	do...	Concrete...	May 16, 1917	1,166.00	189	6172	.89	255.00	94.69	47.07	18.82	884.13	884.13	884.13	3.24	731.20	884.13	884.13	884.13	884.13	884.13	2,281.40	2,392.44	
Varnum...	Seventh...	Eighth...	do...	Concrete...	May 24, 1917	2,537.83	756	6172	.89	624.00	49.69	1,484.31	18.82	50.28	477.60	50.28	50.28	3.24	716.61	50.28	50.28	50.28	50.28	50.28	3,061.51	3,332.44
Varnum...	Seventh...	Eighth...	do...	Concrete...	May 11, 1917	1,703.68	500	6172	.89	200.00	919.38	23.08	18.82	848.23	848.23	848.23	3.24	645.20	848.23	848.23	848.23	848.23	848.23	1,480.68	2,011.44	
Lamont...	Sixth...	Park...	do...	Concrete...	May 8, 1917	1,195.15	352	6172	.89	181.00	679.90	181.00	18.82	1,464.50	1,464.50	1,464.50	3.24	533.50	1,464.50	1,464.50	1,464.50	1,464.50	1,464.50	3,851.48	5,011.44	
Ward...	Kenyon...	Columbia...	do...	Concrete...	June 9, 1917	2,518.64	764	6172	.89	585.00	993.18	93.90	18.82	980.32	980.32	980.32	3.24	765.71	980.32	980.32	980.32	980.32	980.32	2,447.22	3,212.44	
W...	Wisconsin...	Hall...	do...	Asphalt...	July 2, 1917	1,027.40	306	6172	.89	295.00	65.58	2,241.88	18.82	34.72	26.20	26.20	26.20	3.24	24.89	26.20	26.20	26.20	26.20	26.20	1,330.23	1,555.44
Hall...	North of...	W...	do...	Asphalt...	July 16, 1917	2,292.38	673	6172	.89	630.00	1,170.99	28.26	18.82	133.09	133.09	133.09	3.24	145.44	133.09	133.09	133.09	133.09	133.09	3,318.75	3,494.44	
First...	Todd...	U...	Northeast...	Asphalt...	Aug. 20, 1917	740.65	222	6172	.89	45.00	451.00	28.80	18.82	436.56	436.56	436.56	3.24	15.70	436.56	436.56	436.56	436.56	436.56	899.20	1,351.44	
Nichols...	Wheeler...	U...	Southeast...	Asphalt...	In progress...	5,000.00	2,500	6311	1.44	1,022.00	1,022.00	1,022.00	18.82	1,022.00	1,022.00	1,022.00	3.24	1,022.00	1,022.00	1,022.00	1,022.00	1,022.00	1,022.00	765.02	765.02	
Seventeenth...	Franklin...	Franklin...	do...	Asphalt...	Mar. 15, 1917	2,292.38	673	6172	.89	630.00	1,170.99	28.26	18.82	133.09	133.09	133.09	3.24	145.44	133.09	133.09	133.09	133.09	133.09	3,318.75	3,494.44	
Seventeenth...	Franklin...	Franklin...	do...	Asphalt...	Apr. 18, 1917	6184	175	6172	.89	415.20	6215	22.86	18.82	126.69	126.69	126.69	3.24	1,177.92	126.69	126.69	126.69	126.69	126.69	1,430.55	1,557.44	
Gault...	Lincoln...	Second...	do...	Asphalt...	Apr. 24, 1917	6181	435	6172	.89	415.20	6215	22.86	18.82	9.60	9.60	9.60	3.24	6,095.38	9.60	9.60	9.60	9.60	9.60	1,906.83	1,906.83	
Fourteenth...	Franklin...	Irving...	do...	Asphalt...	July 5, 1917	6287	30	6172	.89	6,825.00	6032	1,022.00	18.82	35.07	35.07	35.07	3.24	1,105.21	35.07	35.07	35.07	35.07	35.07	2,047.50	2,204.44	
Naylor...	District of Columbia...	Bia line...	do...	Asphalt...	May 29, 1917	6032	195	6172	.89	21,037.00	6032	1,022.00	18.82	252.19	252.19	252.19	3.24	1,191.95	252.19	252.19	252.19	252.19	252.19	4,102.21	5,346.44	
Sixteenth...	Military...	Alaska...	Northwest...	Asphalt...	July 21, 1917	6218	245	6172	.89	57,981.00	6287	1,022.00	18.82	229.97	229.97	229.97	3.24	22,480.14	229.97	229.97	229.97	229.97	229.97	22,480.14	23,250.44	
Thornton...	Wyoming...	Kalorama...	do...	Asphalt...	Aug. 18, 1917	6287	48	6172	.89	2,954.00	6287	1,022.00	18.82	1,177.92	1,177.92	1,177.92	3.24	1,177.92	1,177.92	1,177.92	1,177.92	1,177.92	1,177.92	1,177.92	1,177.92	
Portland...	Portland...	Southeast and southwest...	do...	Asphalt...	June 26, 1917	6210	33	6172	.89	17,999.00	6210	1,022.00	18.82	6,095.38	6,095.38	6,095.38	3.24	6,095.38	6,095.38	6,095.38	6,095.38	6,095.38	6,095.38	6,095.38	6,095.38	
Forty-eighth...	Deane...	Fifth...	do...	Asphalt...	Aug. 4, 1917	6315	45	6172	.89	6,887.00	6315	1,022.00	18.82	21.75	21.75	21.75	3.24	1,178.66	21.75	21.75	21.75	21.75	21.75	2,597.77	2,745.44	
Buchanan...	Piny Branch...	Sixteenth...	do...	Asphalt...	July 26, 1917	6295	53	6172	.89	1,080.00	6295	1,022.00	18.82	59.85	59.85	59.85	3.24	1,178.66	59.85	59.85	59.85	59.85	59.85	2,597.77	2,745.44	
Buchanan...	Allison...	Kansas...	do...	Asphalt...	Aug. 2, 1917	6287	29	6172	.89	5,058.00	6287	1,022.00	18.82	59.85	59.85	59.85	3.24	1,178.66	59.85	59.85	59.85	59.85	59.85	1,466.82	1,466.82	
Twenty-fourth...	Irving...	Hamlin...	do...	Macadam...	Sept. 7, 1916	1,613.00	715	5685	.89	246.00	3,785.00	47.30	18.82	639.36	639.36	639.36	3.24	96.86	639.36	639.36	639.36	639.36	639.36	96.86	96.86	
Minnesota...	Benning...	Forty-second...	do...	Macadam...	Sept. 30, 1916	2,400.00	1,200	5685	.89	246.00	3,785.00	47.30	18.82	700.89	700.89	700.89	3.24	386.33	700.89	700.89	700.89	700.89	700.89	1,087.44	1,087.44	
Kennedy...	Fifth...	Ninth...	do...	Macadam...	Nov. 14, 1916	1,665.00	441	6172	.89	246.00	3,785.00	47.30														

TABLE E-1.—Statement of contract work on suburban streets and roads for year ending June 30, 1917.

To—	Section.	Kind of pavement.	Date work completed.	Contract work.								Material.								Cost of extra work.	Amount of contract work.	Total cost of work.	Contractor.	
				Square yards.	Length.	Contract number.	Price per square yard.	Grading.	Old cobble removed.	Curb set.	Curb reset.	Cobble or granite block gutters.	Vitrified block gutters.	Vitrified block.	8 by 8 inch curb.	6 by 20 inch curb.	Circular curb.	Cost of material.						
Kalorama	Northwest	Asphalt	Dec. 30, 1916	2,510.27	816	6171	\$1.44	Cu. yds.	Sq. yds.	Lin. ft.	Lin. ft.	Sq. yds.	Sq. yds.	Lin. ft.	Lin. ft.	Lin. ft.	8769.44	\$311.63	\$5,085.01	\$5,854.45	Cranford Paving Co.			
Thirteenth	do	do	Dec. 29, 1916	2,227.20	525	6171	1.44	820.00	48.81	96.20	380.00	1,198.28	1,198.28	177.21	5,500	1,042.96	157.95	151.00	3,812.47	4,124.10	Do.	do		
Clifton	do	do	Dec. 7, 1916	2,194.70	712	6171	1.44	606.00	676.16	1,198.28	169.59	242.16	10,040	1,042.96	1,188.30	5,256.06	4,452.98	4,623.98	5,256.06	6,444.36	Do.	do		
Endid	do	do	Dec. 6, 1916	2,406.56	747	6171	1.44	354.00	757.00	1,198.28	1,198.28	142.58	6,049	1,197.11	1,197.11	1,197.11	137.92	1,197.11	3,914.98	4,052.90	Do.	do		
Cathedral	do	do	Dec. 11, 1916	1,867.31	615	6171	1.44	489.00	489.00	831.65	399.00	127.36	5,280	1,606.00	1,606.00	253.13	11,000	1,606.00	1,606.00	120.38	2,887.73	3,008.11	Do.	do
Kalorama	do	do	Apr. 30, 1917	2,606.23	843	6171	1.44	1,060.00	235.00	1,622.98	1,622.98	120.53	5,208	1,622.98	1,622.98	1,622.98	250.80	1,622.98	5,363.25	5,614.05	Do.	do		
Fifth	do	do	May 12, 1917	1,474.30	478	6171	1.44	343.00	1,200.00	958.87	1,200.00	85.81	3,500	1,474.30	1,474.30	1,474.30	140.62	1,474.30	2,878.13	3,018.75	Do.	do		
Kingle	do	do	June 1, 1917	376.68	343	6171	1.44	146.00	288.00	634.87	36.31	634.87	36.31	394.00	394.00	394.00	587.12	394.00	1,138.93	1,746.05	Do.	do		
Rock Creek Church	do	do	July 20, 1917	6,800.28	1,643	6171	1.44	1,498.00	{ 1 13.00 } 2,241.88	843.24	399.85	16,333	2,134.55	2,134.55	119.25	2,171.49	2,171.49	12,619.75	14,791.24	Do.	do			
Spring	do	Concrete	May 15, 1917	1,270.12	377	6172	.89	205.00	49.43	65.58	3,696.40	1,160.46	1,160.46	18.84	1,160.46	3.24	903.60	2,766.82	3,670.42	Do.	Warren F. Brenizer Co.			
Fourteenth	do	do	June 2, 1917	2,253.88	674	6172	.89	482.00	1,165.16	69.67	1,731.32	97.60	1,701.14	32.83	1,701.14	3,151.28	3,151.28	3,411.71	4,762.99	Do.	do			
Mount Pleasant	do	do	May 21, 1917	2,492.04	923	6172	.89	350.00	1,200.00	928.00	1,484.31	884.13	48.24	731.91	731.91	2,214.22	2,946.13	2,946.13	Do.	do				
Lighth.	do	do	May 24, 1917	1,616.09	180	6172	.89	250.00	1,484.31	64.69	47.07	50.28	47.60	50.28	50.28	50.28	47.60	3,284.40	3,352.16	Do.	do			
Uphur.	do	do	June 24, 1917	2,537.83	756	6172	.89	624.00	1,484.31	679.90	23.08	885.23	33.25	885.23	33.25	885.23	533.59	2,061.51	2,778.12	Do.	do			
Tark.	do	do	May 11, 1917	1,703.68	500	6172	.89	300.00	1,484.31	1,464.50	120.66	1,402.10	75.36	1,402.10	75.36	1,402.10	5,011.10	5,011.10	2,447.22	3,212.93	Do.	do		
Columbia	do	do	June 19, 1917	2,586.64	764	6172	.89	585.00	1,484.31	993.18	93.90	980.32	5.24	980.32	5.24	980.32	765.71	1,592.62	3,851.48	5,011.10	Do.	do		
Hall.	do	do	July 2, 1917	1,027.40	306	6172	.89	295.00	685.00	26.36	34.72	34.72	26.20	34.72	26.20	26.20	24.89	1,530.23	1,555.12	Do.	do			
W.	do	do	July 16, 1917	2,292.38	673	6172	.89	630.00	{ 1 170.99 }	28.26	451.00	28.80	436.56	15.70	436.56	15.70	436.56	145.44	3,348.75	3,494.19	Do.	do		
Upsl.	Northeast	do	do	740.65	222	6172	.89	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	452.60	899.20	1,351.80	Do.	do			
A. point 150 feet west of Seventh.	Southwest	In progress.	Aug. 20, 1917	5,000.00	2,500	6311	6314	do	do	do	do	do	do	do	do	do	765.02	765.02	765.02	765.02	Do.	do		
Franklin	Northeast	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do		
Seventeenth	Northeast	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Second	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Forty-second	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Irvng.	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
District of Columbia line.	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Alaska	Northwest	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Kalorama	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Fourth S.W.	Southwest and southwest.	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Fourth S.E.	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Fifth	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Sixteenth	Northwest	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Bineham	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Kansas	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Hamlin	Northeast	Macadam	Sept. 7, 1916	1,613.00	745	5685	246.00	47.30	3,785.00	639.36	48.70	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	G. B. Mulfitt Co.	
Forty-second	do	do	Sept. 30, 1916	2,400.00	1,200	5685	246.00	47.30	3,785.00	639.36	48.70	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	1,613.00	H. F. Voigt Co.	
North	do	do	Nov. 14, 1916	1,665.00	411	6172	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Buttercut	do	do	Nov. 9, 1916	995.00	407	6172	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
do	do	do	Nov. 11, 1916	1,212.00	404	6172	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	do	
Fifth	do	Cement curb.	Nov. 9, 1916	do	6172	79	15.00	15.00	3,834.50	22.86	278.38	18.84	18.84	17.90	18.84	17.90	18.84	17.90	1,246.57	1,246.57	1,264.47	Do.	do	
Seventh	do	Macadam	Dec. 17, 1916	2,480.00	860	6172	do	do	do	do	do	do	do	do	do	do	do	do	1,55.22	1,55.22	155.22	Do.	do	
Hampton	do	do	June 20, 1917	1,210.00	500	do	do	do	do	do	do	do	do	do	do	do	do	do	2,533.62	2,533.62	2,623.93	Day labor.	do	
Franklin	do	do	June 30, 1917	1,500.00	550	do	do	do	do	do	do	do	do	do	do	do	do	do	1,455.91	1,455.91	1,455.91	do	do	
Central	do	do	June 28, 1917	600.00	400	do	do	do	do	do	do	do	do	do	do	do	do	do	1,178.66	1,178.66	1,178.66	do	do	
District of Columbia line.	do	do	June 6, 1917	4,000.00	2,000	do	do	do	do	do	do	do	do	do	do	do	do	do	896.26	896.26	896.26	do	do	
Thayer	do	do	June 29, 1917	4,920.00	2,200	do	do	do	do	do	do	do	do	do	do	do	do	do	3,799.89	3,799.89	3,799.89	do	do	
Lamont	do	do	June 15, 1917	600.00	270	do	do	do	do	do	do	do	do	do	do	do	do	do	2,490.06	2,490.06	2,490.06	do	do	
Total sheet asphalt.				23,789.41	7,152													748.92	748.92	748.92				
Total concrete.				26,531.75	9,069													689.45	689.45	689.45				
Total macadam.				23,455.00	10,137																			
				73,776.17	26,358				190,035.30	3,233.30	{ 13,549.86 }	{												

TABLE F.—Repairs to asphalt pavements for year ending June 30, 1917.

UNDER CONTRACT WITH CRANFORD PAVING CO., No. 5555.

Street or avenue,	From—	To—	Section,	Kind of pavement,	Contract work.										Material.					Cost of material.	Cost of assessment and permit work.	Cost of sidewalk and curb work.	Cost of contract work.	Total cost of work.	Repairs completed,	
					New pavement.	Resurfacing.	Base.	Binder.	Grading.	Concrete base removed.	Bituminous base removed.	Old curb removed.	Curb reset.	Curb set.	Vitrified-block gutters.	Vitrified-block.	8 by 8 inch curb.	6 by 20 inch curb.	Circular curb.							
M.....	Twenty-sixth.....	Twenty-ninth.....	Northwest.....	Asphalt.....	Sq. yds.	Sq. yds.	Cu. yds.	Cu. ft.	Cu. yds.	Cu. yds.	Cu. yds.	Lin. ft.	Lin. ft.	Lin. ft.	Sq. yds.	Lin. ft.	Lin. ft.	Lin. ft.	Lin. ft.	.....	.....	.....	.....	.....	.....	
Pennsylvania.....	Twenty-sixth.....	Twenty-ninth.....	do.....	do.....	262.17	2,774.68	223.25	2,726.59	106.00	19.00	151.00	55.64	528.76	57.63	174.83	7,630	.....	59.43	8230.75	.....	\$3,820.85	\$4,051.60	Nov. 11, 1916	(Twentieth Rock Coal to Asphalt Bitumene Co. do)		
U.....	Twenty-sixth.....	Twenty-ninth.....	Fifteenth.....	do.....	3,791.69	1,127.38	3.00	1,813.16	1,033.00	30.78	982.22	1,302.00	676.28	1,235.91	190.00	8,300	988.86	.....	289.07	8109.62	.....	14,815.90	Oct. 4, 1916	Coal to Asphalt Bitumene Co. do)		
Seventeenth.....	New Hampshire.....	T.....	do.....	do.....	28.58	1,722.09	16.95	3,352.39	28.75	84.70	109.50	1,281.27	38.98	282.53	12,000	.....	38.76	307.10	.....	3,353.04	3,660.14	July 27, 1916	Asphalt Bitumene Co. do)			
Twenty-sixth.....	Pennsylvania.....	M.....	do.....	do.....	385.91	57.26	.....	68.40	6.00	9.00	72.53	117.40	.....	31.16	1,350	.....	.....	947.96	.....	917.18	36.78	Apr. 25, 1916	Asphalt Bitumene Co. do)			
Twenty-eighth.....	Pennsylvania.....	M.....	do.....	do.....	806.16	576.07	74.06	879.10	6.00	13.25	195.98	46.56	724.13	35.99	91.09	3,578	.....	36.24	110.19	300.18	2,203.38	2,613.75	Nov. 8, 1916	Coal to Asphalt Bitumene Co. do)		
Total.....	.....	.....	.....	.....	157.31	.....	.61	.....	30.00	1.80	38.00	50.00	54.86	50.05	13.36	585	51.09	.....	13.34	65.04	419.99	498.37	Sept. 30, 1916	do		
					5,431.82	6,257.48	317.87	8,839.64	1,209.75	158.53	1,439.73	1,463.70	3,382.70	1,418.56	783.04	33,841	1,039.95	.....	423.50	1,859.64	474.84	.....	24,253.24	26,587.72		

NOTE.—All work done under contract No. 5555 paid out of 1916 appropriations.

UNDER CONTRACT WITH WARNER-QUINLAN ASPHALT CO., No. 6082.

Q.....	Fifth.....	Seventh.....	Northwest.....	Asphalt.....	2,416.30	513.85	20.45	777.60	33.75	10.00	559.18	457.12	774.93	458.79	261.40	11,000	147.83	.....	15.70	8265.72	8544.56	.....	\$6,363.20	\$7,173.48	Sept. 15, 1916	(Fifth Sixth Bitumene Coal to Asphalt Bitumene Co. do)
Marion.....	Q.....	do.....	do.....	do.....	1,218.38	50.73	2.75	64.80	56.25	47.00	285.38	122.00	965.36	18.87	179.46	7,500	.....	18.84	188.50	.....	3,374.07	3,562.97	Sept. 15, 1916			
M.....	First.....	do.....	do.....	do.....	1,440.90	172.56	8.50	291.60	81.25	17.21	223.05	.....	107.77	4,600	.....	.....	.....	104.88	.....	.....	3,240.95	3,344.93	Sept. 15, 1916			
M.....	Sixth.....	do.....	do.....	do.....	1,655.30	191.88	2,341.00	15.83	29.57	319.00	15.83	387.53	30.63	195.13	8,400	50.24	239.25	319.20	1,443.98	6,509.10	8,672.28	Sept. 18, 1916				
O.....	Fourth.....	Sixth.....	do.....	do.....	1,731.04	1,599.47	131.80	2,995.90	210.00	40.01	319.59	1,196.00	42.25	1,166.05	331.81	14,000	1,130.21	48.67	3,085.35	3,924.60	3,321.75	Oct. 7, 1916	Asphalt Vulcanite do)			
Eleventh.....	II.....	I.....	do.....	do.....	1,231.40	49.39	.....	97.20	26.25	102.25	211.26	704.25	14,000	1,443.98	65.01	386.40	10,737.56	11,123.96	Oct. 21, 1916							
Twelfth.....	New York.....	Mass.....	do.....	do.....	4,301.24	95.50	8.50	162.00	235.00	75.12	973.88	65.90	805.20	66.60	333.33	14,200	65.01	205.73	6,227.30	6,434.50	Nov. 17, 1916	Evans Asphalt do)				
Twentieth.....	P.....	Connecticut.....	do.....	do.....	2,398.40	72.09	.....	31.00	154.00	31.60	546.50	35.00	1,408.26	34.78	181.82	7,628	34.54	245.61	3,236.92	3,482.53	Jan. 8, 1917	Evans Asphalt do)				
Seventeenth.....	Pennsylvania.....	H.....	do.....	do.....	1,619.37	84.70	2,281.08	1.25	73.94	67.40	98.00	929.77	68.84	180.56	7,800	71.34	51.42	310.08	694.88	6,493.07	7,498.03	Nov. 22, 1916	Coal to Asphalt do)			
Fourteenth, west side.....	Q.....	U.....	do.....	do.....	2,146.31	155.32	2,928.33	6.00	1.60	306.00	.....	53.78	10.22	450	.....	10.26	.....	3,287.84	3,297.90	Feb. 2, 1917	Asphalt do)					
Fourteenth, east side.....	Q.....	U.....	do.....	do.....	67.82	6,193.13	471.00	10,000.00	170.00	90.00	36.00	1,528.11	636.34	1,543.88	262.37	10,711	1,481.70	77.56	294.70	1,882.09	11,216.31	13,393.10	Mar. 30, 1917	Asphalt do)		
Rhode Island.....	Seventeenth.....	Connecticut.....	Southwest.....	do.....	4,336.36	274.62	10.00	679.86	468.00	234.40	1,146.60	1,425.03	140.70	1,424.27	244.98	10,289	1,336.19	104.80	266.22	1,605.72	\$180.92	12,160.75	14,213.61	Jan. 23, 1917	Evans Asphalt do)	
					255.13	13.67	396.90	3.75	8.00	6.53	22.77	12.69	500	11.40	.....	426.07	437.47	437.47	437.47	437.47	437.47	437.47	437.47	437.47	437.47	
Total Warner-Quinlan Asphalt Co.....	.....	.....	.....	.....	21,302.56	15,154.62	1,121.97	23,616.67	1,572.38	607.61	5,548.70	5,797.90	7,159.92	5,588.91	2,449.38	1,632.78	5,113.21	539.05	2,849.35	6,171.23	180.92	80,882.14	89,883.64	26,587.72	July 19, 1916	Asphalt do)
Total Cranford Paving Co.....	.....	.....	.....	.....	5,431.82	6,257.48	317.87	8,839.64	1,209.75	158.53	1,439.73	1,463.70	3,382.70	1,418.56	783.04	338.41	1,039.95	423.50	1,859.64	474.84	.....	24,253.24	26,587.72	43,853.82		
Grand total.....	.....	.....	.....	.....	26,734.38	21,412.10	1,439.84	32,456.31	2,782.13	766.14	6,988.43	7,261.60	10,542.62	7,007.47	3,232.42	1,371.19	6,153.16	962.55	4,708.99	6,646.07	180.92	104,935.38	116,471.36			

## WORK DONE BY MUNICIPAL PLANT (MINOR REPAIRS, 1917).

75,945 cubic feet old material, at 42 cents.....  
 408 cubic feet topping, at 44 cents.....  
 26,172 cubic feet asphaltic concrete, at 45 cents.....

\$31,896.90  
 179.52  
 11,777.40

43,853.82

TABLE F.—Repairs to asphalt pavements for year ending June 30, 1917.

UNDER CONTRACT WITH CRANFORD PAVING CO., No. 5555.

Section.	Kind of pavement.	Contract work.										Material.					Cost of material.	Cost of assessment and permit work.	Cost of sidewalk and curb work.	Cost of contract work.	Total cost of work.	Repairs completed.	Original pavement.			
		New pavement.	Resurfacing.	Base.	Binder.	Grading.	Concrete base removed.	Bituminous base removed.	Old curb removed.	Curb reset.	Curb set.	Vitrified-block gutters.	Vitrified-block.	8 by 8 inch curb.	6 by 20 inch curb.	Circular curb.							Character of pavement.	Year laid.	Year resurfaced.	Contractor.
		Sq. yds.	Sq. yds.	Cu. yds.	Cu. ft.	Cu. yds.	Cu. ft.	Cu. yds.	Lin. ft.	Lin. ft.	Lin. ft.	Sq. yds.	Lin. ft.	Lin. ft.	Lin. ft.	Lin. ft.										
h..... Northwest.. Asphalt...	262.17	2,774.68	223.25	2,726.59	106.00	19.00	151.00	55.64	528.76	57.63	174.83	7,630	.....	59.43	8230.75	.....	\$3,820.85	\$4,051.60	Nov. 11, 1916	Twenty-sixth-Rock Creek, asphalt..	1877	1897	W. C. Murdock.			
h..... do..... do.....	3,791.69	1,127.38	3.00	1,813.00	1,033.00	30.78	982.22	1,202.00	676.28	1,235.91	190.05	8,300	988.86	.....	289.07	1,167.48	\$100.62	14,815.90	1875	1904	Do.					
h..... do..... do.....	28.58	1,722.09	16.95	3,352.39	28.75	84.70	109.30	1,281.27	38.98	282.55	12,000	.....	31.16	1,350	.....	38.76	307.10	.....	3,353.04	1876	Barber Asphalt Co.					
h..... do..... do.....	385.91	57.26	.....	68.40	6.00	9.00	72.53	117.40	.....	.....	31.16	1,350	.....	30.78	917.18	.....	917.18	1892	Cranford Paving Co.							
h..... do..... do.....	806.16	576.07	74.06	879.10	6.00	13.25	195.98	48.56	724.13	35.99	91.09	3,976	.....	36.24	110.19	300.18	2,203.38	2,613.75	Nov. 8, 1916	Bituminous base..	1889	W. C. Murdock.				
h..... do..... do.....	157.31	.....	6.61	.....	30.00	1.80	38.00	50.00	54.86	50.05	13.36	585	51.09	.....	13.34	110.19	65.04	419.99	1877	Do.						
	5,431.82	6,257.48	317.87	8,839.64	1,209.75	158.53	1,439.73	1,463.70	3,382.70	1,418.56	783.04	33,841	1,039.95	.....	423.50	1,859.64	474.84	24,253.24	26,587.72	Sept. 30, 1916	Coal tar..	1877	Do.			

916 appropriations.

UNDER CONTRACT WITH WARNER-QUINLAN ASPHALT CO., NO. 6082.

Northwest.. Asphalt...	2,416.30	513.85	20.45	777.60	33.75	10.00	559.18	457.12	774.93	458.79	261.40	11,000	447.83	.....	15.70	8265.72	8544.56	.....	\$6,363.20	\$7,173.48	Sept. 15, 1916	Fifth-Sixth, bituminous base..	1890	1896	Cranford Paving Co.
do..... do.....	1,218.38	50.73	2.75	64.80	56.25	47.00	285.38	122.00	965.36	18.87	179.46	7,500	.....	18.84	188.90	.....	3,374.07	3,562.97	Sept. 15, 1916	(Sixth-Seventh, coal tar..	1887	Do.	Barber Asphalt Co.		
do..... do.....	1,440.90	152.38	8.50	291.60	81.25	17.21	223.05	.....	107.00	.....	107.77	4,600	.....	104.88	.....	3,210.05	3,344.93	Sept. 15, 1916	Cranford Paving Co.	1889	Do.	Do.			
do..... do.....	1,655.30	191.88	2,341.00	15.88	29.27	319.50	64.00	386.53	50.63	195.13	8,400	.....	50.24	239.25	.....	3,685.35	3,924.60	Sept. 18, 1916	Asphalt..	1890	1894	J. S. Baldwin.			
do..... do.....	1,731.04	1,599.47	131.80	2,245.90	210.00	40.01	319.50	1,196.00	42.85	1,166.05	331.81	14,000	1,130.21	.....	18.67	319.20	1,443.98	6,500.10	8,672.28	Oct. 7, 1916	Coal tar..	1875	1895	J. V. W. Vanderburgh.	
do..... do.....	1,231.40	49.39	21.25	97.20	26.25	21.25	102.25	21.25	704.25	21.25	102.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25
do..... do.....	4,301.24	95.50	8.55	162.00	235.00	72.12	973.88	65.90	805.20	66.60	333.33	14,200	.....	65.94	386.40	.....	3,322.75	3,324.75	Oct. 10, 1916	Vinilinite coal tar..	1875	1897	Cranford & Hoffman.		
do..... do.....	2,398.40	72.09	.....	31.00	154.00	31.60	546.50	35.00	1,408.26	34.78	181.82	7,628	.....	34.54	206.73	.....	6,227.30	6,344.03	Oct. 21, 1916	.....	1875	1893	Do.		
do..... do.....	1,619.37	84.70	2,281.08	1.25	73.94	67.40	98.00	929.77	68.84	180.56	7,800	.....	71.34	245.61	.....	3,236.92	3,482.53	Jan. 8, 1917	Evans coal tar..	1873	1895	C. E. Evans.			
do..... do.....	2,160.72	417.17	23.40	509.40	111.00	53.21	534.36	800.21	182.18	756.20	147.84	6,200	717.28	.....	51.42	310.08	694.88	6,493.07	7,498.03	Nov. 22, 1916	Asphalt..	1892	John O. Evans.	Barber Asphalt Co.	
do..... do.....	2,146.31	155.32	2,928.33	6.00	1.60	306.00	.....	53.78	.....	10.22	450	.....	10.26	.....	3,287.64	.....	3,297.90	Feb. 2, 1917	Asphalt..	1887	1888	John O. Evans.			
do..... do.....	67.82	6,193.13	471.00	10,000.00	170.00	90.00	36.00	1,528.11	636.34	1,543.88	262.37	10,711	1,481.70	.....	77.56	294.70	1,882.09	11,216.31	13,393.10	Mar. 30, 1917	R.I.-R, 1905	A. L. Barber.			
do..... do.....	4,338.36	274.62	10.00	679.86	468.00	23.40	1,146.60	1,425.03	140.70	1,424.27	244.98	10,289	1,336.19	.....	104.80	266.22	1,605.72	8180.92	12,160.75	T-C, 1900	1892	W. C. Murdock.			
Southwest.. do.....	295.13	13.67	396.90	3.75	8.00	.....	6.53	22.77	12.69	500	.....	11.40	.....	51.42	310.08	694.88	6,493.07	426.07	14,213.61	Jan. 23, 1917	Evans coal tar..	1873	1894	C. E. Evans.	
	21,302.56	15,154.62	1,121.97	23,616.67	1,572.38	607.61	5,548.70	5,797.90	7,159.92	5,588.91	2,449.38	1,032.78	5,113.21	.....	539.05	2,849.35	6,171.23	180.92	80,682.14	89,883.64	July 19, 1916	Asphalt..	1908	Do.	Cranford Paving Co.
	5,431.82	6,257.48	317.87	8,839.64	1,209.75	158.53	1,439.73	1,463.70	3,382.70	1,418.56	783.04	338.41	1,039.95	.....	423.50	1,859.64	474.84	24,253.24	26,587.72	437.47	43,853.82	43,853.82	43,853.82	43,853.82	

## WORK DONE BY MUNICIPAL PLANT (MINOR REPAIRS, 1917).

75,945 cubic feet old material, at 42 cents..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
408 cubic feet topping, at 44 cents..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
26,172 cubic feet asphaltic concrete, at 45 cents..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

43,853.82

June 30, 1917.

No. 5555.

Material.			Original pavement.								
Yds. cu. ft.	6 by 20 inch curb.	Circular curb.	Cost of material, and permits work.	Cost of sidewalk and curb work.	Cost of contract work.	Total cost of work.	Repairs completed.	Character of pavement.	Year laid.	Year resur- faced.	Contractor.
.86	59.43	\$230.75			\$3,820.85	\$4,051.60	Nov. 11, 1916	Twenty-sixth-Rock Creek, asphalt., Rock Creek-Twenty-ninth, coal tar.,	1877	1897	W. C. Murdock.
	289.07	1,167.48	\$109.62		13,538.80	14,815.90	Oct. 4, 1916	Coal tar.....	1875	1904	Do.
	38.76	300.10			3,333.04	3,660.14	July 27, 1916	Asphalt.....	1877		Barber Asphalt Co.
		30.78			917.18	947.96	Apr. 25, 1917	Bituminous base.....	1892		Cranford Paving Co.
1.09	36.24	110.19	300.18		2,203.38	2,613.75	Nov. 8, 1916	Coal tar.....	1889		W. C. Murdock.
		13.34	65.04		419.90	498.37	Sept. 30, 1916	do.....	1877		Do
0.95		423.50	1,839.64	474.84		21,253.24	26,587.72				

Or. No. 6082.

5.83	15.70	\$265.72	\$544.56		\$6,363.20	\$7,173.48	Sept. 15, 1916	Fifth-Sixth, bituminous base..... (Sixth-Seventh, coal tar.....)	1890	1896	{ Cranford Paving Co. H. J. Cranford.
	18.84	188.90			3,374.07	3,562.97	Sept. 15, 1916	Bituminous base.....	1889		Barber Asphalt Co.
		104.88			3,240.05	3,344.93	Sept. 15, 1916	do.....	1890		Cranford Paving Co.
2.21	50.24	239.35			3,685.35	3,924.60	Sept. 18, 1916	Asphalt.....	1890	1894	J. S. Baldwin.
	48.67	319.20	1,143.98		6,900.10	8,672.28	Oct. 7, 1916	Coal tar.....	1875		J. V. W. Vanderbilt.
		35.94	380.40		3,321.75	3,321.75	Oct. 10, 1916	Vulcanite coal tar.....	1875	1897	Cranford & Hoffmann.
	31.54	206.73			10,737.56	11,123.96	Oct. 21, 1916	do.....	1875	1893	Do.
	71.34	245.61			6,227.30	6,434.03	Nov. 17, 1916	Evans coal tar.....	1873	1895	C. E. Evans.
2.28	31.42	310.00	694.88		3,236.92	3,482.33	Jan. 8, 1917	Asphalt.....	1892		Barber Asphalt Co.
		10.26			6,493.07	7,499.03	Nov. 22, 1916	Coal tar.....	1873	1888	John O. Evans.
					3,287.64	3,297.90	Feb. 2, 1917	Asphalt.....	1882	R. L.-R. 1905	{ R. L. Barber.
1.70	77.56	204.70	1,882.09		11,216.31	13,393.10	Mar. 30, 1917	do.....	1882	R. T. 1906	A. L. Barber.
1.19	104.80	266.22	1,605.72	\$180.92	12,160.75	14,213.61	Jan. 23, 1917	Evans coal tar.....	1879	1892	W. C. Murdock.
		11.40			426.07	137.47	July 19, 1916	Asphalt.....	1873	1894	C. E. Evans.
									1908		Cranford Paving Co.
2.21	539.05	2,849.35	6,171.23		180.92	\$0,682.14					
1.95		423.50	1,839.64	474.84		24,253.24					
1.16		962.55	4,708.99	6,646.07	180.92	101,935.38	116,471.36				

S. 1917).

\$31,896.90  
179.52  
11,777.40

43,853.82

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

13

TABLE B AND C.—*Character and extent of roadway pavements, July 1, 1917—Contd.*

## MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphal-tic concrete, concrete base.	Asphal-tic concrete, stone base.	Cement concrete.	Durax block (small granite block).
Northwest, city.....	90.02	1.57	0.51	0.24	0.08	0.30
Northeast, city.....	18.33	8.66	.19	.....	.....	.....
Southeast, city.....	11.08	11.72	.43	.17	.....	.....
Southwest, city.....	13.45	2.25	.68	.....	.22	.....
Georgetown.....	8.74	1.51	.49	.06	.....	.....
Northwest, suburban.....	15.96	4.25	1.31	2.00	3.76	.....
Northeast, suburban.....	3.87	.63	.97	.....	.93	.....
Southeast, suburban.....	1.21	.....	.....	.21	.48	.....
	162.66	30.59	4.58	2.68	5.47	.30
Section.	Granite and rubble.	Vitrified block.	Cobble.	Macadam (estimated).	Gravel and unimproved (estimated).	Total.
Northwest, city.....	6.47	0.50	1.35	2.46	3.12	106.62
Northeast, city.....	.91	.24	.....	4.64	5.00	37.97
Southeast, city.....	2.50	.....	.66	2.56	8.19	37.31
Southwest, city.....	8.55	.27	.51	1.33	3.00	30.26
Georgetown.....	2.71	.03	.04	.14	.76	15.08
Northwest, suburban.....	1.13	.....	.....	83.07	57.00	168.48
Northeast, suburban.....	.61	.....	.....	24.50	45.50	77.01
Southeast, suburban.....	.04	.....	.....	3.94	37.00	42.88
	22.92	1.04	3.16	122.64	159.57	515.61

TABLE G.—*Charges against street railroads (work in connection with paving, resurfacing, and minor repairs) for the fiscal year ending June 30, 1917.*

## CAPITAL TRACTION CO.

Street or avenue.	From—	To—	Section.	Amount.
M.....	Twenty-sixth.....	Twenty-ninth.....	Northwest.....	\$1,271.70
Pennsylvania.....	do.....	do.....	do.....	732.84
U.....	Fourteenth.....	Fifteenth.....	do.....	271.84
Twenty-sixth.....	Pennsylvania.....	M.....	do.....	798.37
U.....	Fifteenth.....	Sixteenth.....	do.....	216.98
Fourteenth, west side.....	Q.....	U.....	do.....	489.43
Fourteenth, east side.....	Q.....	U.....	do.....	494.44
Pennsylvania, north side.....	Fifteenth.....	Bridge.....	Southeast.....	9.39
First.....	Maryland.....	Canal.....	Southwest.....	77.59
Twenty-sixth.....	Virginia.....	K.....	Northwest.....	457.29
Seventh.....	R.....	Florida.....	do.....	586.82
B.....	Seventh.....	Twelfth.....	do.....	97.08
Connecticut.....	Cathedral.....	Klinge Road.....	do.....	24.26
Minor repairs on various streets, District of Columbia repair force.....	.....	.....	.....	1,845.63
Total.....	.....	.....	.....	7,373.66

June 30, 1917.

110 5555

Material.		Original pavement.								
Yds. cu. b.	6 by 20 inch curb.	Cost of material.	Cost of assessment and permit work.	Cost of sidewalk and curb work.	Total cost of work.	Repairs completed.	Character of pavement.	Year laid.	Year resur- faced.	Contractor.
It.	Lin. ft.	Lin. ft.								
86	59.43	\$230.75		\$8,820.85	\$4,051.60	Nov. 11, 1916	Twenty-sixth-Rock Creek, asphalt., (Rock Creek-Twenty-ninth, coal tar.,	1877 1875 1875	1897 1904	W. C. Murdock,
	289.07	1,187.48	\$109.62	13,585.80	14,815.90	Oct. 1, 1916	Coal tar.....	1877	Do	
	38.76	307.50		3,153.04	3,600.14	July 27, 1916	Asphalt.....	1892	Do	Barber Asphalt Co.
		30.78		917.18	947.96	Apr. 25, 1917	Bituminous base.....	1889	Do	Crawford Paving Co.
	36.24	110.19	300.18	2,203.38	2,013.75	Nov. 8, 1916	Coal tar.....	1877	Do	W. C. Murdock,
1.09		13.34	65.04	419.99	98.37	Sept. 30, 1916	do.....	1877	Do	Do
1.95		223.50	1,859.64	474.84	24,253.24	26,587.72				

1082

7-83	15.70	\$265.72	\$544.56		\$6,363.20	\$7,173.48	Sept. 15, 1916	Fifth-Sixth, bituminous base, (Sixth-Seventh, coal tar.	1890	{	Cranton Paving Co.	
18-84	188.90				3,374.07	3,562.97	Sept. 15, 1916	Bituminous base.	1887		H. L. Cranford.	
	104.88				3,240.05	3,314.33	Sept. 15, 1916	...do,	1888		Barber Asphalt Co.	
20-21	50.24	233.25			3,685.35	3,922.00	Sept. 18, 1916	Asphalt.	1890		Cranford Paving Co.	
	48.67	319.20	1,443.98		6,900.10	8,872.28	OCT. 1, 1916	...do,	1879		J. S. Baldwin.	
					3,321.75	3,211.75	OCT. 1, 1916	Vinylite coal tar.	1875		J. V. W. Vancouverburgh.	
	65.91	386.40			10,737.56	11,123.96	OCT. 21, 1916	...do,	1875		Cranford & Hoffman.	
	31.51	206.73			6,227.30	6,154.03	NOV. 17, 1916	Evans coal tar.	1875		Do.	
28	71.31	245.61			3,236.92	3,182.53	JAN. 8, 1917	Asphalt.	1892		C. E. Evans.	
	51.42	310.08	694.88		6,493.07	7,498.03	NOV. 22, 1916	Coal tar.	1873		Barber Asphalt Co.	
				10.26		3,287.64	3,297.90	Febr. 2, 1917	Asphalt.	1888		John O. Evans.
70		77.36	294.70	1,882.09		11,216.31				{	R. L. R. 1905	
19		104.80	266.22	1,605.72	\$180.92	12,160.75	13,393.10	MAR. 30, 1917			R. T. 1906	
			11.40			426.07	14,213.61	JAN. 23, 1917	...do,		T. U. 1900	
21		539.05	2,849.35	6,171.23	180.92	80,682.14	89,883.64	EVANS			A. L. Barber.	
95		123.50	1,859.64	474.84		24,253.24	26,587.72					
16		962.55	1,708.99	6,646.07	180.92	104,935.38	116,471.36					

Ms. A. 1917 b.

TABLE B AND C.—*Character and extent of roadway pavements, July 1, 1917—Contd.*

## MILEAGE.

Section.	Asphalt.	Asphalt block.	Asphal- tic concrete, concrete base.	Asphal- tic concrete, stone base.	Cement concrete.	Durax block (small granite block).
Northwest, city.....	90.02	1.57	0.51	0.24	0.08	0.30
Northeast, city.....	18.33	8.66	.19			
Southeast, city.....	11.08	11.72	.43	.17		
Southwest, city.....	13.45	2.25	.68		.22	
Georgetown.....	8.74	1.51	.49	.06		
Northwest, suburban.....	15.96	4.25	1.31	2.00	3.76	
Northeast, suburban.....	3.87	.63	.97		.93	
Southeast, suburban.....	1.21			.21	.48	
	162.66	30.59	4.58	2.68	5.47	.30
Section.	Granite and rubble.	Vitrified block.	Cobble.	Macad- am (esti- mated).	Gravel and unim- proved (esti- mated).	Total.
Northwest, city.....	6.47	0.50	1.35	2.46	3.12	106.62
Northeast, city.....	.91	.24		4.64	5.00	37.97
Southeast, city.....	2.50		.66	2.56	8.19	37.31
Southwest, city.....	8.55	.27	.51	1.33	3.00	30.26
Georgetown.....	2.71	.03	.64	.14	.76	15.08
Northwest, suburban.....	1.13			83.07	57.00	168.48
Northeast, suburban.....	.61			24.50	45.50	77.01
Southeast, suburban.....	.04			3.94	37.00	42.88
	22.92	1.04	3.16	122.64	159.57	515.61

TABLE G.—*Charges against street railroads (work in connection with paving, resurfacing, and minor repairs) for the fiscal year ending June 30, 1917.*

## CAPITAL TRACTION CO.

Street or avenue.	From—	To—	Section.	Amount.
M.....	Twenty-sixth.....	Twenty-ninth.....	Northwest.....	\$1,271.70
Pennsylvania.....	do.....	do.....	do.....	732.84
U.....	Fourteenth.....	Fifteenth.....	do.....	271.84
Twenty-sixth.....	Pennsylvania.....	M.....	do.....	798.37
U.....	Fifteenth.....	Sixteenth.....	do.....	216.98
Fourteenth, west side.....	Q.....	U.....	do.....	489.43
Fourteenth, east side.....	Q.....	U.....	do.....	494.44
Pennsylvania, north side.....	Fifteenth.....	Bridge.....	Southeast.....	9.39
First.....	Maryland.....	Canal.....	Southwest.....	77.59
Twenty-sixth.....	Virginia.....	K.....	Northwest.....	457.29
Seventh.....	R.....	Florida.....	do.....	586.82
B.....	Seventh.....	Twelfth.....	do.....	97.08
Connecticut.....	Cathedral.....	Klinge Road.....	do.....	24.26
Minor repairs on various streets, District of Columbia repair force.....				1,845.63
Total.....				7,373.66

TABLE G.—*Charges against street railroads (work in connection with paving, resurfacing, and minor repairs) for the fiscal year ending June 30, 1917—Continued.*

## WASHINGTON RAILWAY &amp; ELECTRIC CO.

Street or avenue.	From—	To—	Station.	Amount.
Eleventh.....	H.....	I.....	Northwest.....	\$136.19
Twentieth.....	P.....	Connecticut.....	do.....	15.64
Seventeenth.....	Pennsylvania.....	II.....	do.....	15.89
Rhode Island.....	Seventeenth.....	Connecticut.....	do.....	19.48
Third.....	B.....	Pennsylvania.....	north.....	175.65
W.....	Fourth.....	Fifth.....	Northwest.....	193.09
Eleventh.....	Florida.....	Clifton.....	do.....	368.81
W.....	Eleventh.....	Florida.....	do.....	32.03
B.....	Seventh.....	Twelfth.....	do.....	785.24
Minor repairs on various streets, District of Columbia repair force.....				4,242.44
2,656 cubic feet old material in bulk at portable plant.....				5,210.88
1,608 cubic feet asphaltic concrete in bulk at portable plant.....				402.00
2,811 pounds asphaltic cement in bulk at portable plant.....				27.98
Total.....				11,625.32

## EAST WASHINGTON HEIGHTS TRACTION CO.

Pennsylvania.....	Fifteenth.....	Bridge.....	Southeast.....	\$19.04
Minor repairs on various streets, District of Columbia repair force.....				22.54
Total.....				41.58

## WASHINGTON &amp; VIRGINIA RAILROAD CO.

Minor repairs on various streets, District of Columbia repair force.....		\$245.60
528 cubic feet old material in bulk at portable plant.....		121.44
Total.....		367.04

TABLE H.—*Repairs to streets, avenues, and alleys, 1917.*

## WORK DONE BY DAY LABOR UNDER SUPERVISION OF SUPERINTENDENT OF STREETS.

Brick sidewalk relaid.....	square yards.....	21,156.00
Asphalt block paved.....	do.....	296.00
Asphalt block repaved.....	do.....	11,922.00
Vitrified block paved.....	do.....	534.00
Vitrified block repaved.....	do.....	10,871.00
Macadam roadway.....	do.....	1,540.00
Curb reset.....	linear feet.....	1,708.54
Flag relaid.....	do.....	572.00
Granite block laid.....	square yards.....	5,768.00
Asphalt tile relaid.....	do.....	1,145.00
Cement walk relaid.....	do.....	3,379.00
Cobble relaid.....	do.....	3,059.06
Grading.....	cubic yards.....	4,635.00
Belgium block laid.....	square yards.....	380.00
Cement coping.....	do.....	52.33
Labor.....		
Material.....		\$51,575.43
		\$6,595.60

## RECAPITULATION.

Northwest section east of Sixteenth Street.....		\$21,360.56
Northwest section west of Sixteenth Street.....		13,715.34
Northeast section.....		6,411.98
Southeast section.....		4,059.91
Southwest section.....		8,968.38
Georgetown.....		3,651.86
Total.....		58,171.03

Dangerous holes repaired, 6,000.

TABLE H.—*Repairs to streets, avenues, and alleys, 1917—Continued.*

## WORK DONE BY DAY LABOR UNDER SUPERVISION OF SUPERINTENDENT OF SUBURBAN ROADS.

Job No.	Location.	Work.	Cost.
1012	Belmont Street NW., 100 feet west of Twentieth Street.....	Surface old material...	\$54.25
1017	Massachusetts Avenue NW., across Rock Creek from east end of bridge,	Resurface.....	844.92
1018	Various streets, section 2.....	Tarvia B.....	2,297.11
1020	Both sides Fourteenth Street NW., between Perry Place and Spring Road and west side Fourteenth Street, 122 feet south of Perry Place,	Vitrified block gutters.....	800.02
1026	W Street NW., Second to Flagler Street.....	Repair.....	114.94
1028	Wisconsin Avenue from R to Thirty-fifth Street, and Nineteenth Street from Biltmore to Kalorama Road.	Sand.....	37.83
1030	Eighth Street NW., between Florida Avenue and Euclid Street.....	Repair.....	353.42
1031	Ontario Road NW., between Florida Avenue and Kalorama Road,	.....do.....	364.59
1033	West side Nineteenth Street NW., from Kenyon Street to alley north.	Cobble gutters.....	108.62
1037	Ninth Street NW., between Florida Avenue and Barry Place.....	Repair.....	178.30
1038	Oakdale, Elm, Fourth, Fifth, V, and M Streets NW.....	.....do.....	680.68
1041	North Capitol Street, between V and Michigan Avenue, and south side of Michigan Avenue from North Capitol Street to line of Second Street.	Tarvia B.....	427.43
1043	Both sides Meridian Place NW., Sixteenth to Center Street.....	Granite block gutters.....	199.38
1045	Mount Pleasant Street, north of Newton Street.....	Repair.....	249.03
1046	Park Road NW., Fourteenth to Seventeenth Street.....	Tarvia B.....	170.64
1048	North side Oak Street, from Sixteenth to Center Street.....	Granite block gutters.....	77.75
1049	Morton Street NW., between Warler and Georgia Avenue.....	Cobble gutters.....	203.68
1053	Park Road, between Fourteenth and Seventeenth Streets.....	Tarvia B.....	334.49
1057	Park Road from Soldiers' Home gate to Sherman Avenue.....	Tarvia, patch.....	22.00
1067	North side Lamont Street NW., between Seventeenth and Eighteenth Streets.	Repair.....	35.25
1068	Lamont Street NW., from Mount Pleasant to Eighteenth Street.	.....do.....	199.24
1070	Keefer Street, from Georgia Avenue to Sixth Street, and Sixth Street, between Keefer and Lamont.	Patch.....	214.47
1086	Twenty-fourth Street NW., Massachusetts to California Avenue.	Repair.....	112.91
1091	Apr road to Q Street Bridge.....	.....do.....	152.54
1092	Harvard Street NW., Georgia Avenue to Sherman Avenue.....	.....do.....	70.50
1093	Alley, Square 2005.....	Old material.....	30.50
1102	Hobart Street, west of Mount Pleasant Street.....	Repair.....	49.75
1132	Girard Street NW., east of Georgia Avenue.....	.....do.....	23.50
1128	Grant Street NW., from end of asphalt pavement to Fifteenth Street.	Open roadway.....	257.00
1050	Rock Creek Church Road, between Georgia Avenue and Fifth Street.	Repair.....	462.40
1073	Nineteenth Street NW., between Park Road and Kenyon Street.	.....do.....	163.04
1088	Irving Street NW., between Mount Pleasant and Eighteenth Streets.	.....do.....	341.71
1105	V Street NW., between North Capitol Street and Lincoln Road.	.....do.....	23.50
1126	Otis Place NW., Georgia Avenue to Warler Street.....	.....do.....	149.00
1137	Ninth Street NW., Barry Place to Euclid Street.....	.....do.....	122.62
1178	North Capitol Street, between V Street and Michigan Avenue.....	.....do.....	565.14
1056	Lincoln Road NW., between R and V Streets.....	.....do.....	412.23
1103	New Hampshire Avenue NW., between Park and Georgia Avenue.	.....do.....	228.14
1104	Park Road NW., from Georgia Avenue to Fourteenth Street.....	.....do.....	36.42
	Blacksmith work.....		11,168.94
			146.50
			11,315.44

TABLE I.—Regular permit, 1917.

Job No.	Location.	For whom done.	Grad-ing.	Cement sidewalks.	Curb reset.	Curb set.	Vitrified block paved.	Asphalt block paved.	Brick sidewalk.	Cost.
			Cu. yds.	Sq. yds. 22x22	Lin. feet.		Sq. yds.	Sq. yds.	Sq. yds.	
2000	North side Monroe Street NE, between Tenth and Twelfth.	John B. Lord.....	.....	.....	.....	.....	.....	.....	.....	\$29.47
2001	Fourth Street NE, between V and W Streets.....	B. H. Graver.....	32.00	.....	.....	.....	.....	.....	.....	40.00
2002	1703 Twenty-first Street NW, between Allison and Wester.	Chas. Thom. ....	1	8.00	.....	.....	.....	.....	.....	12.97
2003	West side Fifteenth Street NW, between Allison and Wester.	Shannon & Luehs.....	56	288.53	.....	.....	.....	.....	.....	310.40
2004	North side Webster Street NW, between Fifteenth and Sixteenth Streets.	do.....	18	76.67	.....	.....	.....	.....	.....	105.23
2005	South side Galatin Street NW, between Thirteenth and Fourteenth Streets.	do.....	81.00	.....	.....	.....	.....	.....	.....	98.29
2006	1620-1626 M Str et N V.....	Emerson & Orme.....	149.00	.....	.....	110.15	.....	.....	.....	10
2007	425-427-429 Newton Street NW, Fourteenth and Longfellow	Chas. W. Lewis.....	29.61	.....	.....	.....	.....	.....	.....	274.72
2008	Colorado Avenue NW, Fourteenth and Longfellow fronts.	L. E. and S. I. Branning r.....	363.60	.....	.....	.....	.....	.....	.....	37.78
2009	419-421-423 Newton Street NW, east of Connecticut Avenue.	J. Alfred Moore.....	29.79	.....	.....	.....	.....	.....	.....	483.95
2010	Fast side Georgia Avenue NW, between Buchanan and Crittenton Streets.	T. J. Fisher Co.....	52.00	.....	.....	.....	.....	.....	.....	38.01
2011	Alley, square 2111.....	Chas. L. Kankersky .....	35	117.00	.....	.....	.....	.....	.....	68.28
2012	2220-2222 California Street NW.....	A. C. Moses Construction Co.....	35	.....	.....	.....	66.63	.....	.....	181.56
2014	17 Rhode Island Avenue NE.....	Geo. Simmons.....	.....	.....	133.00	.....	.....	.....	.....	205.12
2016	17 Rhode Island Avenue NE.....	J. H. Hoover.....	3.33	.....	.....	.....	.....	.....	.....	4.57
2017	W Street NW, west of Massachusetts Avenue, lot 6.....	Monier, Burke.....	51.00	.....	.....	.....	.....	.....	.....	79.96
2018	All v. square 3034, r. lot 198-204.....	Kennard Bros. (Inc.) .....	22	.....	.....	.....	175.00	.....	.....	416.01
2019	North side Webster Street NW, between Fifteenth and Sixteenth Streets.	Chas. J. Walker.....	26	109.07	.....	.....	.....	.....	.....	143.37
2020	Front 380 Lincoln Road, M. F. Church.....	Michael J. Ready.....	179.16	165.60	.....	.....	.....	.....	.....	249.54
2024	Lincoln Road, M. F. Church.....	H. W. Belnap.....	60	158.76	.....	.....	.....	.....	.....	242.15
2021	903-905-907 H Str et N.....	H. A. Gary, Jr.....	2	5.66	.....	.....	.....	.....	.....	4.09
2022	Front 10-16 Franklin Street NE, first side, between D and I Streets.	John M. Henderson.....	32	6.7	.....	.....	.....	.....	.....	67.21
2025	First side Eighth Street NW, between Van and W Streets.	James L. Parsons.....	105.00	.....	.....	119.00	.....	.....	.....	329.42
2026	West side Fourth Street NE, between V and W, lots 52, 53, 35.	Robt. Munro.....	23	33	.....	.....	.....	.....	.....	24.25
2027	West side Fourth Street NE, between V and W, lots 52, 53, 35.	W. G. Irvin.....	39.33	.....	.....	.....	.....	.....	.....	40.88
2028	West side Eighteenth Street NW, between F and G Streets.	S. L. Phillips and G. W. Phillips.....	24.00	.....	.....	.....	.....	.....	.....	27.26
2029	Newark Street NW, between Thirty-third Street and Highland Avenue.	John J. Noonan.....	59.64	.....	103	.....	.....	.....	.....	108.72

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

17

2030	Southeast corner Eighteenth and Kearney Streets NE.....	Arthur J. Kause.....	1.50 11	191.54
2031	2144 California Street NW.....	Sullivan & Cary.....	6.00	15.03
2039	California Street NW, west Twenty-fourth Street, lot 80, square 2505.	D. J. Callahan.....	10	183.61
2044	North side California Street NW, between Twenty-fourth and Twenty-fifth Streets.	J. S. Flannery.....	10	103.01
2043	Southwest corn.r Park Road and Mount Pleasant Street.	F. H. Smith Co. ....	12	13.79
2062	841 Street NW.	F. W. Burk r.	10.00	70.21
2015	South side Gallatin Street NW, between Thirteenth and Fourteenth Streets.	F. W. Burk r. & Shannon	150.13	27.98
2023	Northeast corn.r Swan and Webster Streets NW.....	D. J. Partello.....	67	191.56
2032	5019 Forty's con 1 Str of NW.....	C. J. Chanah Rhain.....	4	256.00
2033	Across Cedar Str frontag', lot 2, square 32 6.....	H. L. Thornton.....	39.93	53.59
2034	Southwest corn.r Forty-first and Harrison Streets.	Brtle last msk.....	133.25	115.80
2035	South side Twelfth Street NW, between Sixteenth and Seventeenth Streets.	John L. Watt, n.....	200.96	236.43
			203.48	324.56
2036	North side W Street NW, corn.r Fifth Street.....	J. S. Gruber.....	80.07	103.28
2037	North side Otis Place NW, from Georgia Avenue east.....	L. E. Breuninger F. ....	142.39	184.23
2040	Southside Otis Place NW, from Georgia Avenue east.....	do.....	146.00	150.76
2042	Southeast corn.r Swan and Allison Streets NW.....	B. H. Gruber.....	134.43	171.32
2045	Northeast corn.r Georgia Avenue and Crittenden Street	Harris Shapiro.....	111.33	142.05
2050	200 Twelfth Street NW.....	John F. Muir, ll.....	12.00	35.46
2053	Fifth Street NW, between Taylor and Upland Streets.	W. H. C. Thompson.....	36.53	46.61
2063	North side N Street NW, between First and Third Streets.	Burr M. Edwards.....	14.00	30.00
2038	South side Kearny Street NE, between Seventeenth and Eighteenth Streets.	Wm. A. Hitt.....	177.58	226.00
2046	Southwest corn.r Farragut Street and Finey Branch Road.	Wm. E. Barker.....	59.93	76.47
2047	West side Thirty-fifth Street NW, north of Macomb Street.	C. H. Taylor.....	119.12	183.64
2048	West side Thirteenth Street Street NW, between Hamilton and Gallatin Streets.	Shannon & Luchs.....	364.87	412.54
2049	West side Seventeenth Street NW, between Crescent Place and Kalorama Road.	L. P. McLachlin.....	112.62	465.57
2051	South side Kearny Street NE, between Seventeenth and Eighteenth Streets.	Chas. H. Guilles.....	85.80	296.53
2055	1603-1606 Kearny Street NE, between Ingram and Kennedy Streets.	John R. Halshoff.....	66.67	109.49
2054	North side Colorado Avenue, between Ingram and Kennedy Streets.	Wm. C. Herbert.....	39.70	85.07
2056	9-15 Franklin Street NE, between Butternut and Cedar Streets.	John M. Henderson.....	52.93	50.66
2057	West side Ninth Street NW, between Jackson and Kearny Streets.	G. S. Sux.....	120.13	67.54
2058	South side Otis Place NW, between Sixth Street and Georgia Avenue.	L. E. Breuninger.....	78.00	159.22
2059	Otis Place NW, between Sixth Street and Georgia Avenue.	do.....	103.07	99.53
2060	East side Seventeenth NE, between Jackson and Kearny Streets.	Wm. A. Hitt.....	109.83	131.33
2061	West side Thirty-fourth Street NW, south of Newark Street.	John H. Miller.....	6	140.15
				157.17

TABLE I.—*Regular permit, 1917—Continued.*

Job No.	Location.	For whom done.	Grad-ing.	Cement sidewalk.	Curb reset.	Curb set.	Vitrified block paved.	Asphalt block paved.	Brick sidewalk.	Cost.
2054	1823-1830-1832 Kilbourne Place.....	Thrift Building Co.	Cu. yds.	Sq. yds.	Lin. feet.	Sq. yds.	Sq. yds.	Sq. yds.	\$253.51	
2065	1832-1845 Kenyon Street NW.....	do.....	.....	198.67	.....	.....	.....	.....	187.15	
2066	West side Twenty-third Street NW.....	United States Naval Hos-pital.....	.....	146.67	.....	.....	.....	.....	2,013.89	
2068	Thirty-fifth and Ordway NW, lot 53, Square 1956.....	William S. Minnick.....	Cu. yds.	1,100	921.01	.....	.....	.....	179.81	
2071	West side Thirty-fourth Street, between Facomb and Newark.....	Clarence H. Small.....	.....	22	129.53	.....	.....	.....	133.80	
2072	West side Kearney Street NE., from Twentieth Street west.....	W. S. Plagar.....	.....	.....	101.75	.....	.....	.....	92.13	
2075	Alley, square 100, rear lot 79.....	Chas. A. Myer.....	.....	3	72.20	.....	.....	16.50	35.94	
2061	South side Upshur Street NW, between Rock Creek Church Road and Third Street.....	B. H. Grimes.....	.....	.....	73.07	.....	.....	.....	190.02	
2069	702-704 Allison Street and 4412-4416 Seventh Street NW.....	D. J. Partello.....	.....	.....	170.36	.....	.....	.....	1,252.83	
2070	West side Twenty-fourth Street NE., between Hayes and Irving Street.....	Morris Sabin.....	.....	.....	103.40	.....	.....	.....	1,134.78	
2071	West side Twenty-fourth NE., between Thayer and Irving.....	A. W. Davidson.....	.....	.....	40.00	.....	.....	.....	149.28	
2072	729-717 Kentucky Avenue SE.....	W. A. Boss.....	.....	.....	165.00	.....	.....	.....	1,106.98	
2073	Webster Avenue NW, between Georgia and Iowa Avenue and Iowa Avenue, between Webster and Allison.....	Chas. W. King.....	.....	.....	211.27	.....	.....	.....	1,240.28	
2074	Front 1131-1142 Bu-hannon Street, NW.....	Geo. E. Walker.....	.....	12	94.53	.....	.....	.....	1,120.00	
2075	Randolph Street NE, between Twelfth and Thirteenth Streets.....	W. C. Allard and others.....	.....	.....	66.80	.....	.....	.....	1,82.30	
2076	North side Tracy Place NW, between Twenty-third and Twenty-fourth.....	.....	.....	145	137.23	.....	194.70	.....	1,505.36	
2079	27-37 Girard Street N.E.....	Thos. A. Jameson.....	.....	.....	79.53	.....	.....	.....	1,97.97	
2080	326 and 328 New Jersey Avenue NW.....	Janes. W. Clark.....	.....	.....	59.83	43.00	.....	.....	1,85.54	
2082	South side East Capitol Street, between Sixteenth and Seventeenth Streets SE.....	Harry A. Kite.....	.....	.....	186.63	.....	.....	.....	1,188.88	
2083	Front lots 10 and 11 Tennessee Avenue NE., between B and C Streets, and C Streets.....	do.....	.....	.....	141.60	.....	.....	.....	1,143.30	
2084	515-533 and 1,511-534 Morton Street NW.....	do.....	.....	.....	175.20	.....	.....	.....	1,215.85	
2085	618-626 Hobart Street.....	do.....	.....	.....	69.11	.....	.....	.....	1,45.43	
2086	2146-2152 Ninth Street NW.....	do.....	.....	.....	27.78	.....	.....	.....	1,34.23	
2087	North side Varnum Street NW, between Rock Creek Church Road and Second Street.....	Winfield Preston.....	.....	.....	80.00	.....	.....	.....	1,98.56	
2088	2225 Cathedral Avenue.....	A. L. Morton.....	.....	.....	12.22	.....	.....	.....	1,15.00	

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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1 Appropriation 1916.

\* Appropriation 1916, not completed.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE K.—Assessment work, 1917.

Job No.	Location.	Grading.	Cement sidewalk.	Curb reset.	Curb set—			Vitrified block paved.	Asphalt block paved.	Cobble block paved.	Granite block.	Cement alley.	Cost.	
					Cu. yds.	Sq. yds.	Lin. ft.	6 by 20 inches.	8 by 8 inches.	Old.	Sq. yds.	Sq. yds.	Sq. yds.	
3010	Alley, square 3532	177	.....	.....	.....	.....	.....	.....	18.84	.....	.....	.....	.....	\$873.69
3011	Alley, east half, square 3096	189	.....	.....	.....	.....	.....	.....	56.52	.....	.....	.....	.....	1,093.79
3012	Alley, south half, square 3241	250	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,013.74
3013	Alley, square 1054	1,050	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,926.81
3014	South side Belmont Road NW, between Nineteenth and Twentieth Streets	50	.....	.....	315	.....	.....	.....	.....	.....	.....	.....	.....	473.80
3015	South side California Street NW, between Twenty-third and Twenty-fourth Streets	30	.....	.....	300	.....	.....	.....	.....	.....	.....	.....	.....	463.51
3016	North side California Street NW, between Twenty-third and Twenty-fourth Streets	757	.....	.....	.....	.....	.....	50	75.36	178	.....	.....	.....	8,231
3017	Alley, square 722	20	.....	.....	.....	.....	.....	55	.....	421	.....	.....	.....	2,850.19
3018	Alley, square 75	79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	107.33
3019	Alley, square 234	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,029.78
3020	Alley, square 2, 20	450	.....	.....	.....	.....	.....	.....	37.68	.....	967	.....	.....	128.75
3021	Alley, square, 353	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,486.00
3022	Alley, square 617	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	* 4.38
3024	Alley, square 1977	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	* 13.50
3023	Alley, square 283	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	* 5.00
3025	Alley, square 2865	360	.....	.....	.....	.....	.....	.....	.....	.....	195	264	.....	228.38
3026	Alley, square 2579	65	.....	.....	.....	.....	.....	.....	.....	.....	.....	879.41	.....	488.76
3027	Alley, square 991	1,250	.....	.....	.....	.....	.....	.....	.....	.....	827	.....	.....	3,729.98
3028	Alley, square 2835	1,355	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,182
3029	Alley, square 2923	355	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,145.22
3030	Alley, square 895	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	98.37
3039	Alley, square 969	70	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	615.48
3040	West side Nineteenth Street NW, from Belmont Road to alley	.....	.....	.....	.....	.....	.....	.....	.....	.....	164	.....	.....	* 44.88
3041	Alley, square 1233	70	.....	.....	130.80	.....	.....	.....	.....	.....	.....	.....	.....	360.04
3042	South side Douglas Street NE, between Twelfth Street and Brentwood Road	145	.....	.....	.....	.....	.....	.....	.....	.....	1,372	.....	.....	318.97
3044	Alley, square 1501	508	.....	.....	.....	.....	.....	.....	.....	.....	309	.....	.....	3,219.78
3045	Alley, square 984	.....	.....	.....	.....	.....	.....	.....	.....	.....	109	.....	.....	1,260.77
3046	Alley, square 70	.....	.....	.....	.....	.....	.....	.....	.....	.....	730	.....	.....	463.43
3047	Alley, square 88	.....	.....	.....	.....	.....	.....	.....	.....	.....	505	.....	.....	* 2,472.00
3048	Alley, square 441	250	34	.....	.....	.....	.....	.....	.....	.....	198	.....	.....	1,679.76
3049	Alley, square 2829	50	.....	.....	.....	.....	.....	.....	.....	.....	287	.....	.....	497.54
3050	Alley, square 378	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	494.62
3086	Both sides New Jersey Avenue SE., between C and D Streets	948.47	715	.....	.....	.....	.....	.....	.....	.....	21	.....	.....	1,249.53

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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3087	West side Twelfth Street NE, between Monroe and Newton, and north side Monroe Street NE, between Tenth and Twelfth Streets.	301.22	334.36
3090	North side Longfellow Street NW, between Colorado Avenue and Thirteenth Street NW, between (Colorado Avenue to alley).	249	317.71
3098	East side Saratoga Avenue NE, from Rhode Island Avenue to alley.	248.60	317.21
3103	West side Fourth Street NE, between V and W Streets.	141.30	148.33
3114	West side Thirty-fourth Street NW, between Lowell Alley, square 939.	225	418.96
3119	and Macomb Streets.	.....	1,699.16
3120	North side New York Avenue NW, from Seventeenth to Eighteenth Streets.	225	126.51
3121	East side Twenty-second Street NW, from Cement to D Streets.	99.15	165.86
3122	South side E Street NW, from Twentieth to Twenty-second Streets.	159.55	1,602.13
3123	Both sides I Street NW, from Twenty-second to Twenty-third Streets.	1,201.03	1,142.63
3124	West side Nineteenth Street NW, between E and F Streets.	795.24	692.46
3125	East side Twenty-second Street NW, between H and I Streets.	518.62	454.35
3126	East side Twenty-second Street NW, between G and H Streets.	328.83	553.00
3128	Alley, square 2397	403.36	820
3130	Alley, square 182	117	1,495.14
3131	Alley, square 2917	12	1,259.30
3133	Alley, square 2109	350	2,636.29
3134	East and west alley, square 2669	101	1,066.66
3140	East side Twenty-ninth Street NW, between Cathedral Avenue and Woolley Road.	50	352.12
3144	South side Monroe Street NE, between Fourteenth and Fifteenth Streets.	7	180.27
3146	Meridian Place NW, between Sixteenth and Center Streets.	76.73	97.90
3159	West side Fifteenth Street NW, between Sixteenth and L Street NW, between Fifteenth and Sixteenth Streets.	4.20	150.71
3173	North side L Street NW, between Fifteenth and Sixteenth Streets.	312.04	431.09
3174	South side Ward Place NW, from New Hampshire Avenue north to alley.	234.56	204.61
3175	North side M Street NW, from Twenty-seventh to Twenty-ninth Streets.	104.85	102.57
3181	East side Ninth Street NW, between L and M Streets.	520.61	537.07
3184	East side Seventh Street NW, between H and I Streets.	61.68	65.37
3081	Seventeenth Street NW, from Pennsylvania Avenue to H Street.	191.36	200.75
3127	Alley, square 1033	912	764.37
3132	Alley, square 1031	244	2,014.72
3111	North and south alley, square 276.	.....	1,311.02
		558	902.29
		18.84	417
		97.50	801
		6	801

# Previous labor and work, etc., 1916 appropriation.

\* Building cement wall.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE K.—*Assessment work, 1917—Continued.*

Job No.	Location.	Grading, Cement sidewalk.	Curb reset.	Curb set— 6 by 20 inches.	Curb set— 8 by 8 inches.	Vitrified block paved.	Asphalt block paved.	Cobble paved.	Granite block.	Cement alley.	Cost.
310357	South side California Avenue NW, between Twenty-third and Twenty-fourth Streets.	Cu. yds.	Sq. yds.	Lin. ft.	.....	224.42	.....	.....	.....	.....	\$307.66
31170	East side F Fourteenth Street NW, between Q and T Streets.	225	.....	.....	1,501.26	1,065	.....	.....	.....	.....	2,070.30
32000	Alley, square 186	400	.....	225	.....	526	.....	.....	.....	.....	2,444.84
31159	Alley, square 3648	292	.....	400	36.64	815.50	2,590	.....	.....	.....	1,741.19
32063	Alley, square 1051	.....	.....	.....	414.12	.....	.....	.....	.....	.....	1,986.26
30848	Street N.W., between Fifth and Sixth Streets.	.....	.....	.....	58.80	1,247.46	.....	.....	.....	.....	589.02
30847	Both sides Rhode Island Avenue NW, from Seventeenth Street to Connecticut Avenue.	.....	.....	.....	.....	1,166.05	.....	.....	.....	.....	1,706.29
30443	South side O Street NW, from Fourth to Fifth Streets.	453.04	.....	451.60	9.40	.....	.....	.....	.....	.....	1,588.38
30800	West side Twelfth Street NW, between D and E Streets.	380.60	57	.....	.....	.....	.....	.....	.....	.....	631.29
31176	North side D Street NW, between Ninth and Tenth Streets.	604.50	12.50	.....	.....	.....	.....	.....	.....	.....	420.53
31177	West side Ninth Street NW, from F to G Streets.	321.17	.....	.....	.....	.....	.....	.....	.....	.....	643.56
31178	West side Ninth Street NW, from H to I Streets.	527.56	.....	.....	.....	.....	.....	.....	.....	.....	237.26
31179	East side Ninth Street NW, between K and L Streets.	403.31	.....	.....	.....	.....	.....	.....	.....	.....	552.04
31180	East side Ninth Street NW, between G and H Streets.	111.91	.....	.....	.....	.....	.....	.....	.....	.....	422.25
31182	Both sides Ninth Street NW, between J and K Streets.	1,237.31	.....	.....	.....	.....	.....	.....	.....	.....	117.12
31183	East side Twelfth Street NW, between Rand's streets.	440.91	.....	.....	.....	.....	.....	.....	.....	.....	1,306.60
31184	South side D Street NW, between Sixth and Seventh Streets.	672.67	391	70	.....	.....	.....	.....	.....	.....	463.26
31185	North side O Street NW, from Fifth to sixth Street.	271.41	.....	.....	.....	.....	.....	.....	.....	.....	857.51
31186	South side N Street NW, between Kirby Place and Third Street.	135.85	72	.....	.....	.....	.....	.....	.....	.....	282.75
31187	North side N Street NW, between Hamilton Place and Third Street.	630.79	198	.....	.....	9.42	.....	.....	.....	.....	170.88
31188	West side Kirby Street NW, between New York Avenue and N Street.	400.61	453.40	.....	.....	.....	.....	.....	.....	.....	748.99
31189	Both sides P Street NW, between North Capitol and First Street.	1,564.37	1,355.50	.....	.....	42.50	.....	.....	.....	.....	553.79
31190	Alley, square 3017	95	.....	.....	37.08	.....	.....	.....	.....	.....	2,196.31
31191	Alley, square 3020	222	.....	18.84	.....	32.50	.....	.....	.....	.....	2,173.01
31192	West side, north, and south alley, Square 298.	2N	.....	.....	.....	555.75	.....	.....	.....	.....	244
31193	Alley, square 2812	3116	.....	.....	.....	453.83	.....	.....	.....	.....	672
31194	Alley, square 3041	3197	.....	.....	37.94	.....	.....	.....	.....	.....	1,663.48
31195	Alley, square 3871	3121	.....	.....	37.08	18.84	.....	.....	.....	.....	745
31196	Alley, square 3201	406	.....	.....	68	482	.....	.....	.....	.....	1,467.99

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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		28, 26	18, 14	
3292	Alley, square 102	110	597	1,411.00
3297	111½ Street, 62	2,096	210	551.21
3298	Alley, square 182		1,092	5,227.00
3298	North side C Street NW, between Second and Third Streets	180.31		180.00
3299	North side C Street NW, between First Street and Second Street, from First Street to M Street, south to West side North Capitol Street, between D Street and Massachusetts Avenue	382.56		400.97
3299	Second Street NW, from C Street, south to cement walk	707.70	104	738.95
3299	Second Street NW, from C Street, south to cement walk	225.25		235.94
3299	Alley, square 242	55		410.42
3299	Alley, square 104			110.30
3299	Alley, south half, square 69	75		385.12
3299	Alley, square 265			985
3299	Both sides New York Avenue, between North Capitol and First Streets	2,199.86		1,930.43
3297	West side North Capitol Street, from M Street, south to cement walk	288.91	607	2,294.51
3135	West, north, and south alley, square 212	390	445	240.25
3138	Alley, square 288			1,576.64
3205	Alley, square 103½	483	18.84	1,461.68
3206	Alley, square 103½		1,045	2,251.74
3246	Alley, square 266			1,814.86
3082	East side Tenth Street SE, between B and C Streets	493.91	292	563.24
3091	South side B Street SE, between Eighth and Ninth Streets	340.78	62	386.29
3094	West side Wisconsin Avenue NW, from Edmunds to Fulton Streets	165.33		
3106	West side Thirteenth Street SE, between C and D Streets	333.40	316.24	214.26
3109	North side California Street NW, between Twenty-third and Twenty-fourth Streets	281.83	433.30	809.91
3141	South side Allison Street NW, from Eighth Street to cement walk	257	202	961.85
3210	West side Fifteenth Street NW, from Lanouit to Sixteenth Street	179.47	52.20	426.47
3211	South side Varnum Street NW, between alleys in Square 3226	33	137.33	214.02
3213	West side Four-and-a-half Street SW, between Maine and Maryland Avenues	896.92		200.42
3213	West side Four-and-a-half Street SW, between Virginia Avenue and E Street	930.01	379.40	939.49
3220	Both sides D Street SW, from Third to Four-and-a-half Street	1,480.94	151	1,094.28
3221	West side Fourth Street SE, from Pennsylvania Avenue to C Street	108.22		1,094.28
3221	Both sides 14th Street SW, from G to H Streets	585.37	641	1,612.41
3225	South side East Capitol Street, between Kentucky Avenue and Massachusetts Avenue, and South side Massachusetts Avenue SE, between East Capitol and Thirteenth Streets	460.21	4.77	486.28
3298	South side of E Street Capital Street from Twelfth Street to Kentucky Avenue	124.14		132.35

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

TABLE K.—*Assessment work, 1917—Continued.*

3072	North side Bryant Street NW, from Fourth Street east to cement walk.....	33	109.11	1 155.11
3080	South side Oakdale Place NW, from Second Street to Lot 94, Square 30-4-NW, between Thirty-first street and North side M Street NW.....	33	93.31	1 313.94
3082	South side Wisconsin Avenue and Wisconsin Avenue and Wisconsin Avenue, between Thirteenth and Eleventh Streets, Laird Place NE, between Hamlin and Ginnard.....	396.18	23.60	1 881.80
3091	Both sides Laird Place NE, between Hamlin and Ginnard.....	109	162.11	1 265.67
3108	South side S Street NW, between Twenty-third and West side Fourteenth Street NW, intersection Piney Branch, continue at Custer Street, from Fourteenth to Fifteenth Streets.....	65	254.21	1 624.71
3116	West side Fourteenth Street NW, from Irving north to cement walk.....	85	658.40	1 859.90
3158	South side W Street NW, from Fourteenth to Fifteenth Streets.....	499.26	.....	1 510.21
3172	West side Fourteenth Street NW, from Irving north to cement walk.....	119.47	.....	1 122.56
3183	South side Pennsylvania Avenue S E, between Twentieth and Twenty-seventh Streets, from Belmont Road north to alley.....	105	270.20	2 368.48
3193	West side Nineteenth Street NW, from Belmont Road West side Eleventh Street NW, between Lamont and Park Road.....	272.16	.....	1 434.79
3194	West side Eleventh Street NW, between Lamont and Park Road.....	234.51	.....	1 288.91
3196	South side R Street NW, between Connecticut Avenue and cement walk.....	332.89	198	1 405.13
3197	East side Wisconsin Avenue NW, between Maconh and Newark Street.....	260.67	.....	1 321.16
3198	East side New Hampshire Avenue, from V to Fifteenth Streets.....	295.85	.....	1 302.48
3199	North side V Street NW, between New Hampshire Avenue and Sixteenth Street.....	293.60	9.42	1 209.26
3200	South side Buchanan Street NW, Georgia Avenue to Iowa Avenue.....	107	383.47	1 537.17
3201	South side U Street NW, Thirty-fifth Street to Thirty-fifth Place, east side Thirty-fifth Place, from T to U; and north side T Street, from Thirty-fifth Place to Thirty-fifth Street.....	326.65	.....	1 404.09
3209	South side L Street NE, between Second and Fifth Streets,.....	691.73	460	1 849.77
3211	South side Laurence Street NE, between Thirteenth and Fourteenth Streets.....	420.47	.....	1 518.02
3213	North side Perry Street NE, between Twelfth and Thirteenth Streets.....	163	408	1 601.27
3222	East side Sherman Avenue NW, from Morton to Park Road.....	170.59	.....	1 172.63
3223	West side Eighth Street NW, from Florida Avenue to Barry Place.....	1,099.26	1,432	1 824.03
3224	East side Ontario Road NW, between Columbia Road and Euclid Street.....	66.93	.....	1 97.59
3225	East side Ninth Street NW, between Allison and Buchanan Streets.....	105.20	.....	1 129.61

\* Appropriation, 1916, not completed.

† Appropriation, 1916.

TABLE K.—*Assessment work, 1917*—Continued.

3265	North side P Street NW, from Thirty-first east to cement walk.....	511.35	508.30	
3266	West side Phelps Place NW, between Florida Avenue and S Street.....	228.59	225.70	
3267	East side Thirt-fourth street NW, between R Street and Wisconsin Avenue.....	453.25	617	
3268	East side Chapman Street NW, between Florida Avenue and Euclid Street.....	1,216.10	1,711	
3269	Both sides of N Street NW, between Potomac and Thirty-third streets.....	255.25	269	
3271	North side P Street NW, between Twenty-seventh and Twenty-eighth Streets.....	105.30	.....	
3272	West side Rolmead Place NW, between Monroe and Perry Place.....	500.29	.....	
3273	East side of New Tanshine Avenue NW, from U north to cement walk.....	323.31	136.73	
3274	West side Fourteenth Street NW, from Spring Road north to cement walk.....	597.69	.....	
3275	North side Wyoming Avenue NW, between Connecticut Avenue and Twentieth Street.....	246.07	26.30	
3276	North side Meridian Place, between Fourteenth and Sixteenth Streets.....	312.87	.....	
3277	West side Thirty-sixth Street NW, between P Street and cement walk south.....	180.59	.....	
3278	West side Thirt-fifth Street NW, from Prospect Street north to cement walk.....	161.13	.....	
3279	Both sides N Street NW, between Thirty-fourth and Thirty-fifth Streets.....	480.92	337	
3280	South side Wyoming Avenue NW, from Connecticut Avenue to Twentieth Street.....	387.24	190.40	
3281	South side Western Avenue NW, from Connecticut Avenue to Rittenhouse Street and south side Rittenhouse Street from Western Avenue to Thirty-third.....	321	2,009.81	
3282	North side Taylor Street NW, from Third to Rock Creek Church Road and west side Rock Creek Church Road from Taylor Street north.....	249.58	.....	
3283	East side Iowa Avenue, between Allison and Buchanan Street.....	280.40	.....	
3284	Both sides Seventh Street NW, from Upshur to Varum Street.....	443.22	.....	
3285	West side Ninth Street NW, from Upshur to Varnum Street.....	207.53	.....	
3286	Both sides Elm Street NW, from Second to Third Streets.....	417.35	.....	
3287	East side Thirt-fourth Street NW, between Woodley Road and Lowell Street.....	243.13	.....	
3288	North side Lowell Street, between Thirty-fourth and Thirty-fifth Streets.....	323.64	.....	

1 Appropriation, 1916.

1,699.27  
1,366.79  
1,775.90  
1,2,065.82  
1,356.13  
1,108.23  
1,734.17  
1,487.14  
1,821.61  
1,266.49  
1,397.26  
1,184.41  
1,197.51  
1,710.95  
1,460.44  
2,804.25  
310.78  
1,435.40  
1,548.65  
1,255.68  
1,374.84  
1,324.03  
1,398.74

TABLE K.—*Assessment work, 1917—Continued.*

Job No.	Location.	Grading.	Cement sidewalk.	Curb reset.	Curb set.	6 by 20 8 by 8 Inches.	Vitrified block paved.	Asphalt block paved.	Granite block.	Cement alley.	Cost.
3289	East side Colmeed Place NW, from Otis Street north to cement wall.....		101.73	Lin. ft.			Sq. yds.	Sq. yds.	Sq. yds.	Sq. yds.	1125.33
3290	North side Patterson Street NW, from cement walk west to Connecticut Avenue.....		75.33								109.14
3291	Both sides W Street NW, from Flagler Place to Second Street.....		239.60								1,295.19
3292	South side Monroe Street NW, between Eleventh and New Hampshire Avenue.....		85.60								1,107.11
3293	South side Otis Place, from Eleventh Street to alley west.....		93.40								1,115.07
3294	South side Meconb Street NW, between Connecticut Avenue and Ross Place.....		631.09								1,777.50
3295	Both sides Fourteenth Street NW, between Spring Road and Ferry Place.....					711.65					1,945.19
3296	West side Wisconsin Avenue NW, between Haro Place and Thirty-seventh Street.....		1,071.55			909.80					1,386.88
3298	Westside Seventh Street NW, between Randolph and Shepherd.....		239.66								1,311.13
3299	North side Ingraham Street, from Georgia Avenue east to alley.....		67.72								1,83.43
3300	West side Fourteenth Street NW, Ferry Place to Spring Road.....		146.02								1,179.89
3301	East side Brown Street NW, from end of cement walk to Oak Street.....		121.68								1,159.16
3308	Both sides Duvaltart Avenue NW, between Thirty-first and Wisconsin Avenue.....		940.46	1,001.40							1,306.34
3001	Northwest section, east of Sixteenth Street.....										23,516.44
3002	Northwest section, west of Sixteenth Street.....										21,527.97
3003	Southwest section.....										22,204.49
3004	Southeast section.....										3,375.10
3005	Northeast section.....										3,120.63
3006	Georgetown section.....										4,1,832.61
											15,270 196,457.12
18,680.40	54,859.03	21,818.43	1,635.38	12,050.82		26.30	20,669.08	3,299	57	6	

1 Appropriation, 1916.

2 General repairs.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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TABLE L.—*Sidewalks and curbs, 1917.*

Job No.	Location.	Cement sidewalk.	Curb reset.	6 by 20 inches.	8 by 8 inches.	Old.	Vitrified block paved.	Asphalt block paved.	Cobble block paved.	Granite block paved.	Brick sidewalk relaid.	Grading.	Cost.
2507	South side Clifton Street NW, between Eleventh and Thirteenth Streets.	Sq. yds.	Lip. ft.				yds.	Sq. yds.	Sq. yds.			Cy. yds.	\$354.56
2508	First Street SW, between " and O Streets.	54	750	25	9	74	9.42	3	150	.....	.....	2.50	105.72
2519	Fifteenth Street, front United States Treasury Building.	1,714.91	776.82	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,630.18
2520	East side Twelfth Street, between B Street north and B Street south.	1,432.12	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,435.07
2522	West side Fourteenth Street SW, between B and Water Street.	1,214.33	28	.....	1,040.43	.....	.....	.....	.....	.....	.....	.....	2,445.40
2528	North side of M Street SW, between Twenty-seventh and Twenty-ninth Streets.	138.06	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	132.54
2515	Thirteen-hundredth Street side, New Central High School.	1,178.84	477.47	237.30	.....	.....	9.42	.....	.....	.....	.....	.....	1,140.69
2521	Colored High School.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	533.54
2525	Rhode Island Avenue, front of Reservation No. 151.	2525	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	18.92
2527	Twelfth Street side reservation, Twelfth and R Streets NW.	82.72	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	81.43
2535	Front Reservation 182, north side New York Avenue between North Capitol and First Streets.	144.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	138.34
2540	Front of school, north side P Street NW, between North Capitol and First Streets.	354.84	300	465	50	.....	.....	.....	.....	.....	.....	.....	450.45
2514	B Street front Monroe Park, Georgetown.	534	58.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	689.76
2516	Reservation 318.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112.79
2529	Lincoln Road NE, from T Street to existing walk.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	37.45
2538	South side Lamont Street SW, from Fifteenth to Sixteenth Streets, Reservation 309 A.	31.19	5.30	327.27	183.30	140	18.84	132	.....	.....	.....	.....	335.46
2539	East side Sixth Street, between E and F Streets.	.....	.....	.....	.....	1,234	.....	.....	.....	.....	.....	.....	527.83
2543	Newton and Otis Streets, side of school.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	586.43
2512	Around old Government Printing Office.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,126.13
2501	North west section, east of Sixteenth Street.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,25.75
2502	Northwest section, east of Sixteenth Street.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,27.86
2503	Southwest section.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,33.50
2504	Southeast section.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
		9,582.07	1,623.90	18.84	1,978.16	.....	136	.....	150	.....	.....	192.40	14,125.10

<sup>1</sup> Repairs.

TABLE M.—*Miscellaneous work, 1917.*

Job No.	Location.	Appropriation.	Grad-ing.	Relaid brick side-walk.	Curb reset.	Curb set.	Vitrified field block relaid.	Asphalt block relaid.	Granite block relaid.	Cement road-way laid.	Cobble side-walk.	Description.	Cost.
1700	Pennsylvania Avenue SE., Fifteenth Street to bridge.	Southeast schedule	Cu. yds. Sq. yds. Lin. ft.	50 130	.....	Sq. yds. 45	Sq. yds. 45	Sq. yds. 150	Sq. yds. 150	.....	.....	\$274.96	
6001	Union Station Plaza and vicinity.	Elimination of grade crossing.	.....	510	.....	.....	30	500	.....	75	.....	2,690.08	
6003	New York Avenue, east of asphalt plant.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.88	
6004	Part of alley, Square 724... N Street, NE, between North Capitol and First Streets.	.....	.....	.....	.....	120	.....	510	.....	104	.....	66.37	
6005	.....	.....	.....	.....	.....	.....	59	.....	.....	15	.....	445.32	
6008	Virginia Avenue and K Street, SE.	Public schools, New Central High School...	.....	230	321	.....	.....	.....	.....	1,163.72	.....	857.80	
6009	.....	District of Columbia.	.....	.....	55	.....	.....	.....	.....	.....	.....	1,005.61	
6014	Pennsylvania Avenue, bridge across Rock Creek.	Pennsylvania Avenue Bridge across Rock Creek.	.....	.....	.....	.....	.....	.....	.....	.....	.....	Connecting lamp-posts.	
6018	Twenty-sixth Street NW, at intersection Pennsylvania Avenue.	.....	.....	.....	.....	.....	.....	.....	.....	.....	Repair.	10.42	
6023 <sub>1</sub>	North side Pennsylvania Avenue NW, between Twenty-eighth Street and west end of bridge and east side Twenty-eighth Street from Pennsylvania Avenue to M Street.	Both sides Pennsylvania Avenue.	.....	do.....	75	322	.....	.....	.....	.....	.....	20.11	
6027	.....	.....	.....	.....	.....	200	333	.....	250	.....	80	.....	103.19
6031	New Jersey Avenue bridge over Virginia Avenue.	Elimination of grade crossing, Police department, District of Columbia.	.....	.....	.....	.....	.....	.....	.....	.....	.....	Erecting pipe rail barricade.	28.65
6043	Various streets,.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Marking reservations.	35.08

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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6015	Fifteenth street and Maryland Avenue, N.E., end of reservation.	Municipal architect's office.	Asphalt hauled away.	60. 89
6025	Calvert Street, crossing of Rock Creek (test holes).	Plans Calvert Street bridge.	.....	354.12
6041	Eastfront Bureau Engraving and Printing.	.....	.....	85. 88
6046	First and B Streets SE.....	.....	.....	100. 56
6022	Industrial Home School....	Elimination of grade crossing.	.....	549. 76
1510	Third Street NW, between B Street and Pennsylvania Avenue.	Industrial Home School.	.....	594. 08
1512	East side Twenty-third Street NW, between B Street and New York Avenue.	.....	.....	226. 75
1513	W Street NW, Florida Avenue to Eleventh Street.	.....	.....	88. 08
1603	First Street SW, Maryland Avenue to Canal Street.	Southwest schedule.	300	.....
1700	Pennsylvania Avenue SE, Fifteenth Street to bridge.	.....	5	.....
5011	Canal Road NW, south side	.....	215	Old material road-way.
5022	Champlain Avenue, Florida Avenue to Kalorama Road.	Canal Road retaining wall.	269	Repairing sidewalks, etc.
5031	Clifton Street NW, Eleventh to Thirteenth Streets.	.....	.....	.....
5071	Eleventh Street NW, Florida Avenue to Clifton Street.	Pave Clifton Street NW.	.....	.....
5090	Fifteenth Street NW, Sixteenth to Lamont Streets.	Macadamize Fifteenth Street NW.	.....	.....
5191	Keokuk Street NW, Connecticut Avenue to Thirty-seventh Street.	Grade and improve Keokuk Street NW.	.....	.....
5281	Ord Street NE, Kenilworth Road to Forty-fourth Street.	Grade and improve Ord Street NE.	.....	.....
5341	Perry Place NW, Holmead Place to Spring Road.	Pave Perry Place NW.	.....	.....
5391	Seventh Street NW, between Varnum and upholster Streets.	Pave Seventh Street NW.	.....	.....
5421	Sixteenth Street NW, north of Montague Street.	Grade and improve Sixteenth Street NW.	.....	Stripping top soil and hauling work.

TABLE M.—*Miscellaneous work, 1917—Continued.*

6002	Anacostia Bridge.....	Maintenance of bridge across Anacostia River.	Painting.....	1,271.13
6006	Various streets.....	Par 1 <sup>st</sup> Commis. s or.	Paving treespaces,	1,605.40
6035	Bridge 35, M Street,.....	M Street Bridge.....	Paving and hand rails.	617.8
5031	Connecticut Avenue NW, Cathe <sup>r</sup> l Avenue to Kirk Road.	Pave Connecticut Avenue.	Removing mac-adam.	1,215.44
5111	Fifth street NW..Aspen to Butternut Streets.	Grade and improve Fifth Street NW.	Grading and spreading stone.	1,186.77
5121	Forty-first Street NW, Davenport to Elliott Street.	Grade and improve Fourteenth Street NW.	Spreading stone .....	587.70
5131	Franklin and Seventeenth Streets NE.	Grade Franklin and Seventeenth Streets NE.	Cleaning up, etc...	291.31
5181	Kennedy Street NW, be- tween Eighth and Ninth Streets.	Grade and improve Kennedy Street NW.	Grading and spreading stone.	410.31
5220	Madison Street NW., Four- teenth to Colorado Avenue.	Grade and mac-adam e Madri- son Street NW.	Grade and mac-adam lang.	1,178.66
5361	Quarles Street NF., Kenil- worth to Minnesota to Aven. e.	Grade and im- prove Quarles Street NE.	Spreading stone, etc.	1,768.79
5401	Sixth Street NW..Aspen to Butternut Streets.	Grade and im- prove Sixth Street NW.	.do.....	915.72
				25,165.34
	1,217.50	3,077	717	505.41
				510
				921
				897.50
				2,425
				1,522.72
				696

TABLE N.—*Whole cost work, 1917.*

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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TABLE O.—Number of square yards and cost of repairs to cuts in streets, avenues, and alleys during the fiscal year ended June 30, 1917.

Item No. 1 shows the cost of repairs to cuts charged various plumbers, public-service corporations, and individual depositors. Five per cent is added to "whole cost work" for the maintenance of the municipal trust fund deposits (District of Columbia) operating account, streets, this fund being used to pay for labor, tools, various materials, etc., used in connection with the repairing of cuts.

Item No. 2 shows the cost of work done on account of various appropriations of the sewer department.

Item No. 3 shows the cost of work done on account of the water department.

Item No. 4 shows the cost of work charged against other appropriations of the District of Columbia and various appropriations of the General Government.

Item No. 5 shows the number of square yards of various kinds of pavements repaired.

## PLUMBERS, PUBLIC-SERVICE CORPORATIONS, AND INDIVIDUAL DEPOSITORS.

	Flat rate.	Whole cost.	Total.
<b>Item No. 1:</b>			
Plumbers.....	\$8,619.84	-----	\$8,619.84
Corporations.....	23,011.05	\$40,001.85	63,012.90
In individual depositors.....	789.35	2,742.49	3,531.84
<b>Item No. 2:</b>			
Sewer department.....	1,727.41	7,666.29	9,393.70
<b>Item No. 3:</b>			
Water department.....	6,187.43	12,344.63	18,532.05
<b>Item No. 4:</b>			
Miscellaneous appropriations.....	5,193.07	22,851.94	28,045.01
<b>Total.....</b>	<b>45,528.15</b>	<b>85,607.20</b>	<b>131,135.34</b>
<hr/>			
	Square yards.		
Flat rate.	Whole cost.	Total.	
<b>Item No. 5:</b>			
Sheet asphalt.....	\$3,449.49	\$8,539.30	\$11,988.79
Vitrified block.....	870.61	2,759.05	3,629.66
Asphalt block.....	1,794.31	5,766.03	7,561.00
Granite block.....	835.08	6,638.45	7,473.53
Cobble.....	406.62	929.11	1,335.73
Brick.....	2,620.89	542.56	3,113.45
Macadam.....	1,578.39	1,205.20	2,783.59
Cement sidewalk.....	8,955.88	-----	-----
<b>Total.....</b>	<b>20,511.27</b>	<b>26,380.36</b>	<b>46,891.63</b>

Total number of charges made for repairing cuts, etc., 8,640.

TABLE P.—Grading streets, alleys, and roads, 1917.

Job No.	Location.	Grading.	Cost.
1907	Alley, square 939.....	Cu. yds. 0	\$111.19
1908	Seventh and Alisicn Streets NW.....	2,054	1,627.18
1909	Belmont Street NW., 100 feet west of Twentieth Street.....	400	10.75
1910	Thayer Street N.E., between Rhode Is'nd Avenue and Twenty-fourth Street.....	390	47.12
1911	South side Fran'lin Street N.E. (southwest corner Twenty-second Street). .	300	179.25
1912	Thirteenth Street N.E., between Irving and Jackson Streets.....	230	145.88
1913	Irving Street N.E., 400 feet west of Twentieth Street.....	104	83.00
1918	Adjacent to cement walk, Buchanan Street and Iowa Avenue.....	750	390.75
1919	New Hampshire Avenue NW., between Upshur Street and Grant Circle.....	75	29.00
1922	Concord Avenue, between North Capitol Street and Blair Road and between North Capitol Street and Shepherd Road.....	900	445.88
1923	South side of Rhode Island Avenue NE., between Fifteenth and Sixteenth Streets.....	238	114.02
1924	Tra'y Pla'e.....	150	124.25
1925	Buchanan Street NW., between Georgia and Iowa Avenues.....	844	422.50
1928	Taylor Street NW., between Fifth Street and Rock Creek Church Read.....	150	73.75
1929	Dahlia Street NW., 300 feet west from Seventh Street.....	450	223.00
1930	Forty-first Street N.E., between Bennings Road and East Capitol Street.....	115	56.56
1932	Intersection of Thirty-fifth Pla'e and U Street.....	180	98.75
1933	Fifty-sixth Street N.E., 150 feet south of Linwood Place.....	140	70.82
1934	Alley, square 209.....	75	23.50
1937	Randolph Street N.E., between Twelfth Street and Michigan Avenue.....	105	48.38
1938	Webster Street NW., 100 feet east of Seventh Street.....	300	131.75

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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TABLE P.—*Grading streets, alleys, and roads, 1917—Continued.*

Job No.	Location.	Grading.	Cost.
		Cu. yds.	
1939	Kastle Place NE., south of Fitch Place.....	280	\$139.25
1917	West Street SW., south of Morris Road.....	150	73.37
1912	Seventh and Webster Streets NW. (northeast corner).....	800	206.75
1944	Montague Street NW., between Fourteenth Street and Piney Branch Road.....	110	53.00
1945	Alley, square 1890.....	223	25.87
1946	Twenty-fourth Street NW., California Avenue to Tracy Place and Tracy Place from Twenty-fourth Street eastward.....	600	342.81
1947	Broad Branch Road, between Livingston and Morrison Streets.....	300	193.10
1948	Fourth Street NE., from Michigan Avenue to entrance to St. Paul's College.....	493	272.36
1931	Vista Street NE., between Central and South Dakota Avenues.....	500	238.37
1957	Vista Street NE., east of South Dakota Avenue.....	400	261.93
1930	Twenty-eighth Street NE., between Evarts and Franklin Streets.....	1,474	424.30
1919	Hayes Street NE., Minnesota Avenue to Forty-second Street.....	140	67.06
1959	Fourteenth Street SE., between R and S Streets.....	250	122.93
1967	Quincy Street NW., Cedar Road to Thirteenth Street.....	95	46.50
1985	Intersection Twenty-eighth and Douglas Streets NE.....	42	25.00
1931	Alley, square 1795.....	40	20.76
1951	Alley, square 1855, north of Ingomar Street.....	13	26.25
1952	Seventh Street NW., Varnum to Webster Street, and Seventh to Grant Circle.....	800	342.82
1954	Intersection of Iowa Avenue and Allison Street.....	200	108.37
1983	Meridian Place NW., between Center and Sixteenth Streets.....	50	24.00
1984	Twenty-ninth Street NW., south of Cathedral Avenue.....	25	10.75
1986	Lowrie Place, south of Hayes Street.....	85	40.00
1956	Iowa Avenue NW., between Georgia Avenue and Webster Street.....	143	72.61
1958	Twenty-ninth Street NW., near Cathedral Avenue.....	55	31.75
1982	East end of alley, square 1873.....	72	39.75
1926	Piney Branch Road, between Fourteenth and Spring Road.....	95	45.44
1917	Various sidewalks, cleaning.....		1,441.97
1936	Bruce Place SE., between Eighteenth and Nineteenth Streets.....	1,400	690.30
1940	U Street NW, north of Conduit Road.....	200	94.12
1955	Bank east side roadway, Bladensburg Road.....	190	85.37
1962	Twenty-ninth Street NW, at Woodley Road.....	45	16.50
1966	Otis Place NW., between Georgia Avenue and Warder Street.....	1,150	510.50
1987	Thirteenth Street NE., between Girard and Hamlin Streets.....	446	197.75
1988	Hayes Street NE., from Division Avenue to St. Catharine Street.....	250	120.12
1989	Allison Street NW., between Illinois Avenue and Eighth Street.....	425	168.75
1997	Broad Branch Road.....	500	214.50
1995	Various roads, Berry Farm.....	90	44.25
1998	Hamilton Street, between Piney Branch Road and Sixteenth Street.....	350	161.25
1901	Various streets, northwest section, east of Sixteenth Street.....	570	233.00
1902	Various streets, northwest section, west of Sixteenth Street.....	690	345.44
1905	Various streets, northeast section.....	859	429.95
1906	Various streets, Georgetown section.....	178	71.31
	Total.....		12,289.06

## REPORT OF THE SUPERINTENDENT OF STREET CLEANING.

WASHINGTON, D. C., October 4, 1917.

SIR: I have the honor to submit the following report of the street-cleaning division, engineer department, for the fiscal year ended June 30, 1917.

The operations of the street cleaning division involve two distinct functions—the disposal of waste material originating on public property, commonly known as street cleaning, and the disposal of waste materials, originating on private property, commonly known as city wastes. At the present time the street-cleaning work is done by the municipality directly, while the city wastes are removed by contract.

The amount of material removed by the municipality as street sweepings and by the contractors as garbage, ashes, and miscellaneous refuse, as compared with the Washington Monument, shows that were any one of these four materials piled up on a base equal to that of the monument, the height of the year's accumulation would in every case be far above its top, even though the original area were maintained throughout as opposed to the considerable taper of the monument. Were the four classes of waste to be piled one on top of the other on an equal base, the resulting accumulation would be over 4,300 feet in height, or, roughly, seven and one-half times the existing height of the monument.

To remove this amount of waste naturally requires a considerable force, especially when one considers the large area which must be worked over to obtain a wagonload of street dirt, or the number of houses which must be visited before a garbage wagon becomes filled. The maximum force employed on any one day during the past year totaled approximately 700 men and 250 vehicles, while the average daily force employed approximated 600 men and 200 vehicles.

The total funds available to carry on the work of the division totaled over half a million dollars, divided as follows:

Streets, District of Columbia, 1917, cleaning, etc.....	\$310,000 00
Streets, District of Columbia, 1917, disposal of city refuse.....	191,620.00
Salaries, office, District of Columbia, 1917.....	42,980.00
Allotment for maintenance of motor vehicles, contingent and miscellaneous expense, District of Columbia, 1917.....	8,225.60
Allotment for contingent expenses, contingent and miscellaneous expenses, District of Columbia, 1917.....	800.00
 Total amount of appropriations.....	 553,625.60

If it were not for a revenue which the contractors obtain from the sale of materials, such as grease and fertilizer, reclaimed from the garbage; and paper, rags, bottles, metals, etc., from the refuse; this yearly appropriation would have to be about three-quarters of a million dollars, which represents the approximate present gross cost of the work.

At first glance it would seem as though this were an enormous expenditure for the cleaning of the streets and removal of the ordinary householders' wastes. The actual cost of the individual householder, however, for the entire service is comparatively small. The latest police census (1915) gives the total population as 357,749, which, divided into the total amount of appropriations given above, shows a cost per capita per annum of \$1.547 made up as follows:

Streets, District of Columbia, 1917, cleaning, etc.....	\$0.866
Streets, District of Columbia, 1917, disposal of city refuse.....	.536
Salaries, office, District of Columbia, 1917.....	\$0.120
Allotment for maintenance of motor vehicles, contingent and miscellaneous expense, District of Columbia, 1917.....	.023
Allotment for contingent expenses, contingent and miscellaneous expenses, District of Columbia, 1917.....	.002
 Total amount per capita per annum.....	 1.547

#### STREET CLEANING.

The best method of cleaning streets is by hand patrol or white wings, supplemented by washing with either squeegees or flushers. The duty of the hand patrolmen is to remove the coarser particles before they have a chance to become crushed by the traffic into dust and to keep the gutters clean. The washing machines are intended to remove all fine dust which, with the mucous from the horse droppings and oil from motor vehicles, makes the pavements slippery when wet.

The area cleaned by this method has gradually been increased. If at present it consisted of a single street 30 feet wide, it would be approximately 212 miles in length and would extend almost from Washington to New York. The expenditure for hand-patrol work and washing represents over two-thirds of the total expenditure for street-cleaning work.

The 1917 appropriation act authorized the purchase of motorized street-cleaning apparatus. A 5½-ton truck equipped with 1,000-gallon tank, motor-driven pump, flushing and sprinkling heads, etc., was purchased on January 3 at a cost of \$4,785. Over 6,000,000 square yards of pavement have been flushed with this machine at a cost per 1,000 square yards of 11.8 cents, or less than one-half the cost of horse-drawn flushing. This cost may increase slightly as the machine becomes more worn.

A 3½-ton motor truck equipped with 1,000-gallon tank, rubber broom, etc., has been purchased at a cost of \$5,050 for use as a squeegee. This machine has not yet been delivered. A 2-ton tractor is likewise to be delivered for use in hauling material collected by the hand patrol. This machine cost \$2,100.

A comparison of the yardage cleaned during the year indicates that slightly less work has been done. This is almost entirely due to the fact that work could be done on fewer days. The decreased area squeegeed is partly compensated for by the increased yardage flushed, a number of streets having poor pavements being transferred from the squeegee schedule to that of territory cleaned by the motor flusher.

The direct total costs and unit costs per 1,000 square yards are all increased. This is partly due to the increased cost of supplies, but more particularly to the increase in labor cost. On September 1, 1916, the rate of pay for hand-patrol men, broom men, etc., was raised from \$1.50 to \$1.75 per eight-hour day, while that for drivers was increased from \$1.75 to \$2 for a corresponding period.

## COLLECTION AND DISPOSAL OF CITY WASTES.

A new contract for the collection and disposal of ashes went into effect July 1, 1916. Specifications for this contract were practically the same as the preceding contract. The new contractor experienced considerable difficulty in obtaining equipment and labor to perform the work required, and on October 23 the commissioners found it necessary to institute a supplementary service under the provisions of the contract. This service was continued until November 3, when the prior contractor took over the work as an agent of the contractor. The fact that the contractor's claim of labor difficulties had good foundation is evidenced by the fact that it was found necessary to again institute a supplementary service from February 17 to February 26, although the organization then performing the work was the same as had very satisfactorily carried on the identical contract for a number of years past.

The unsatisfactory state of the ash service is reflected by the liquidated damages deducted and the number of complaints found to be the fault of the contractor. Difficulties similar to those experienced by the ash contractor were affecting the service of the remaining contractors, so that complaints and liquidated damages exceeded all previous years.

The high price of foodstuffs during the year has materially affected the garbage tonnage. The contractor also claims that there has been a considerable reduction in the percentage of grease recovered from the garbage, which would seem to be a natural consequence of high prices.

Congress was again requested to permit the collection and disposal of city wastes by the municipality, and for an appropriation to build the necessary plants, etc., but without success. As the present contracts expire on June 30, 1918, it was necessary to prepare plans and specifications if time was to be available in which to build any new plants, etc. The endeavor in preparing these plans and specifications was to secure the type of equipment which would have been operated by the municipality had municipal collections been authorized, and likewise to require that all buildings or plants erected in or near the District would be of a sightly and sanitary nature. Bids on these specifications were returnable July 2, 1917.

J. W. PAXTON,  
*Superintendent Street Cleaning.*

*Assistant to the Engineer Commissioner, District of Columbia.*

*Table showing comparative data in connection with street-cleaning work, 1913 to 1917.*

SQUARE YARDS CLEANED.

	1913	1914	1915	1916	1917
Hand patrol.....	766,918,000	835,588,000	1,027,020,000	1,052,765,000	1,024,688,000
Machine sweeping.....	236,067,000	267,557,000	217,235,000	218,852,000	219,869,000
Alley cleaning.....	61,354,000	58,671,000	66,206,000	67,842,000	65,471,000
Suburban streets.....	43,595,000	34,296,000	43,549,000	50,127,000	58,940,000
Squeegeing.....	144,629,000	144,878,000	167,754,000	187,794,000	169,566,000
Flushing.....	20,703,000	22,424,000	26,304,000	23,696,000	27,485,000
Motor flushing.....					6,135,000

DIRECT TOTAL COST.

Hand patrol.....	\$117,980.15	\$116,921.65	\$135,553.98	\$138,571.03	\$148,401.40
Machine sweeping.....	46,088.96	41,756.07	32,378.12	31,405.83	37,583.20
Alley cleaning.....	19,908.48	19,795.31	21,914.70	22,155.20	24,221.64
Suburban streets.....	18,552.80	13,591.99	14,269.23	15,900.32	20,164.21
Squeegeing.....	17,026.64	17,478.55	19,337.40	20,037.40	20,560.73
Flushing.....	5,148.78	5,210.98	5,099.30	5,033.32	7,829.54
Motor flushing.....					721.60

*Table showing comparative data in connection with street-cleaning work, 1913 to 1917—Continued.*

## COST PER 1,000 SQUARE YARDS.

	1913	1914	1915	1916	1917
Hand patrol.....	\$0.154	\$0.140	\$0.132	\$0.132	\$0.145
Machine sweeping.....	.161	.156	.149	.144	.171
Alley cleaning.....	.325	.337	.331	.326	.371
Squeereeing.....	.117	.121	.115	.106	.121
Flushing.....	.248	.232	.194	.212	.285
Motor flushing.....					.118

NOTE.—Changes and improvements in methods of measuring and distribution prevent exact comparison between the figures for different years. The above costs include only labor pay rolls; forage, shoeing, and other stable expenses; supplies, such as brooms, shovels, etc.; and repairs to equipment.

Total cost of street cleaning, including all charges, except interest on investment and depreciation.....	\$325,214.48
Population served (police census of 1915).....	357,749
Cost per capita per year.....	\$0.909

*Table showing comparative data in connection with disposal of all city wastes from 1913 to 1917.*

## NUMBER OF UNITS COLLECTED.

	1913	1914	1915	1916	1917
Garbage.....tons..	50,778	48,927	50,806	52,207	44,683
Ashes.....cubic yards..	200,430	255,358	148,190	135,305	151,783
Miscellaneous refuse.....do..	138,382	140,683	146,152	157,180	149,810
Night soil.....barrels..	19,895	15,514	12,949	12,741	11,227
Dead animals.....number..	21,287	19,148	20,570	22,724	24,562

## TOTAL NET COST.

	\$68,388.00	\$68,384.00	\$68,374.00	\$69,788.00	\$69,756.00
Garbage.....	73,129.00	73,007.00	73,041.00	68,935.00	59,052.00
Ashes.....	16,593.00	16,583.50	16,609.00	28,187.00	27,954.25
Miscellaneous refuse.....	16,600.00	14,962.00	14,996.00	14,990.00	14,994.00
Night soil.....	2,855.00	2,853.00	2,855.00	2,988.00	2,988.00
Dead animals.....					

## COST PER UNIT.

	\$1.34	\$1.39	\$1.34	\$1.34	\$1.56
Garbage, per ton.....	.36	.29	.49	.51	.39
Ashes, per cubic yard.....	.12	.12	.11	.18	.19
Miscellaneous refuse, per cubic yard.....	.83	.96	1.16	1.17	1.33
Night soil, per barrel.....	.134	.149	.14	.13	.12
Dead animals, each.....					

## LIQUIDATED DAMAGES DEDUCTED.

	\$12.00	\$16.00	\$26.00	\$52.00	\$84.00
Garbage.....	21.00	143.00	109.00	65.00	948.00
Ashes.....	407.00	416.50	391.00	213.00	445.75
Miscellaneous refuse.....	38.00	4.00	10.00		6.00
Night soil.....					
Dead animals.....					

NOTE.—The reduction in cubic yards of ashes collected is due to the reports of previous years being in error. The amount collected during 1915 and 1916 is probably below the average because of the mild winters, but checks on the amount reported collected by the contractor during the summer of 1914 indicate that too large an amount had previously been reported.

The table herewith gives a comparison of the number of complaints investigated by this division during the past two years:

	Garbage.				Ashes.				Refuse.			
	1916	Per cent.	1917	Per cent.	1916	Per cent.	1917	Per cent.	1916	Per cent.	1917	Per cent.
Complaints:												
Fault of contractor.....	49	11	86	14	130	15	1,123	49	271	19	387	24
Fault of householder.....	132	29	200	32	255	29	514	23	464	32	512	32
Doubtful.....	276	60	339	54	484	56	627	28	724	49	704	44
Total complaints.....	457	100	625	100	869	100	2,264	100	1,459	100	1,603	100
Total requests.....	111	.....	103	.....	278	.....	392	.....	250	.....	225	.....
Grand total.....	568	.....	728	.....	1,147	.....	2,656	.....	1,709	.....	1,828	.....

*Miscellaneous data; collection and disposal of city wastes.*

Class of waste.	Contractor.	Period of contract.	Date of expiration.	Price per annum.	Collected from—
Garbage.....	Washington Fertilizer Co.	3 years.	June 30, 1918	\$69,840.00	All places producing garbage.
Ashes.....	Charles E. Myers..	2 years.	.....do.....	60,000.00	Residences, small boarding and lodging houses, small apartments.
Refuse.....	Michael R. Ready.	3 years.	.....do.....	28,400.00	Residences, small lodging and boarding houses, small apartments.
Dead animals....	Charles F. Mann.	...do...	.....do.....	2,988.00	Every part of the District.
Night soil.....	Warner-Stutler....	5 years.	.....do.....	15,000.00	All privies in the District.
Ashes and refuse from public buildings.	Charles E. Myers..	1 year.	June 30, 1917	1.38	Public buildings under control of commissioners.

<sup>1</sup> Per cubic yard.

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*Miscellaneous data, street-cleaning work.*

Class of work.	Territory under attention.		Character of territory under attention.	Interval of cleanings, etc.	Force employed, etc.
	July 1, 1916.	June 30, 1917.			
Machine brooming.....	Sq. yds. 1,361,735	Sq. yds. 1,698,152	All paved streets outside hand-patrol area.	Daily, every other day, or every third day, depending on location and traffic.	2 gangs, totaling 3 two-horse sprinklers, 9 two-horse brooms, 11 one-horse carts, and 12 broomers.
Alley cleaning.....	1,120,095	1,152,523	All paved alleys in District.....	About once each week; alleys in business section, with heavy traffic, twice each week.	3 gangs, totaling 3 one-horse sprinklers, 2 one-horse brooms, 11 one-horse carts, and 17 broomers.
Suburban cleaning.....	1,639,681	1,535,339	Macadam, gravel, and unpaved streets in suburbs, unpaved public alleys.	2 gangs, totaling 2 one-horse sprinklers, 8 one-horse carts, and 22 laborers.	2 gangs, totaling 2 one-horse wagons and 6 gauges, totaling 14 two-horse wagons and 6 gauges, totaling 14 two-horse wagons and 6 gauges.
Hand patrolling.....	3,731,092	3,732,429	All streets in the central portion of the city.	From 1 to 8 or 10 times each day, depending on location and traffic.	1 gang of 3 three-horse pneumatic type flushing machines.
Flushing.....	341,622	235,096	Cobblestone, granite, asphalt, block, and poorly paved streets, in hand-patrol area.	About every three days; dirt flushed to gutter removed by hand patrol.	.....
Motor flushing.....	315,174	2,353,058	Nearly all of the smoothly paved streets in hand patrol area.	About every two days in summer, three in winter; dirt removed by hand patrol.	3 gangs, totaling 3 two-horse sprinklers, 12 two-horse squeegees, and 1 three-horse squeegee.
Squeegeing.....	2,338,077	2,338,077	.....	.....	Varied from 1 two-horse spreader wagon and 2 two-horse supply wagons to 2 spreader and 3 supply wagons.
Dust prevention; oiling.....	1,161,987	1,103,116	Coeating of practically all the better class of suburban streets with emulsion road oil.	About 10 times per season.....	Varied from 2 to 6 two-horse sprinklers.
Dust prevention; springing.....	(1)	(1)	Practically all suburban streets not oiled; heavy oil streets in bad condition, etc.	About twice each day, weather permitting.	.....

<sup>1</sup> Indefinite; depends on season, weather, etc.

*Miscellaneous data; collection and disposal of city wastes.—Continued.*

Class of waste.	City proper and more thickly settled suburbs.		Outlying suburbs.		Manner of collection.	Manner of disposal.	Location of disposal plant.
	Summer.	Winter.	Summer.	Winter.			
Garbage.....	Daily and Sunday throughout year.	3 per week...	3 per week...	2 per week...	Horse-drawn vehicles carrying covered metal tanks.	Filled tanks are transported by rail to reduction plant owned by contractor.	Cherry Hill, Va., about 32 miles from city.
Ashes.....	Not collected.....	1 per week...	2 per week...	1 per week...	Horse-drawn bottom-dump wagons, canvas covers.	Used as fill on low ground in outskirts of city.	None.
Refuse.....	.....do.....	.....do.....	1 per week...	.....do.....	Horse-drawn slat wagons, canvas covers.	Salable portion picked out. Residue put through incinerator owned by contractor and ashes therefrom used as fill.	Twenty-sixth and Benning Roads, N.E., about 2½ miles from city.
Dead animals....	Collected within 8 hours in winter and 6 hours in summer after notice from superintendent of street cleaning.		Automobile with closed body for small animals; horse-drawn special wagons for large.		Hauled in vehicle making collection to reduction plant owned by contractors.	Four Mile Run, Va., about 4 miles from city.	
Night soil.....	Collected within 48 hours after receipt of notice from the superintendent of street cleaning.		Horse drawn vehicle with special air-tight receptacles.		Transferred in these receptacles on barges to farm about 8 miles from city and used as fertilizer.	None.	
Ashes and refuse from public buildings.	.....do.....		Horse-drawn, bottom-dump wagons, canvas covers.		Used as fill on low ground in outskirts of city.	Do.	

## REPORT OF THE INSPECTOR OF ASPHALTS AND CEMENTS.

WASHINGTON, D. C., September 11, 1917.

SIR: I have the honor to submit the following report showing the operations of this office during the fiscal year ended June 30, 1917.

There was a decrease in the total number of samples of cement tested during the year, 9,423 against 14,475. This caused principally by the completion of Central and Dunbar High Schools and on other buildings erected for the District in which cement furnished by the District was used in their construction.

## ASPHALT BLOCK.

All blocks used by the District in the paving of avenues, streets, and alleys were manufactured by the Washington Asphalt Block & Tile Co., contractors, in which Trinidad and Texaco asphalts mixed in the proportion of 65 and 35 parts, respectively, was used.

## ASPHALT PAVEMENTS.

During the year there were laid by the Cranford Paving Co., contractors for laying new asphalt pavements, approximately 68,400 square yards, in which Aztec and Bermudez asphalts was used.

The Warner-Quinlan Asphalt Co., contractors for repairing and resurfacing asphalt pavements, laid about 36,500 square yards, using Montezuma asphalt exclusively.

All streets laid during the year are at present in good condition, and it is the opinion of this office the asphalts used will prove satisfactory.

## PORTLAND CEMENT.

Tested 9,423 samples, representing 94,240 barrels. Results of tests and by whom submitted are shown in Tables Nos. 11 and 12 accompanying.

During the year several new pieces of apparatus have been designed by the office for use in determining the specific gravity and voids of various materials and examination and photographing the mesh of sieves used in examination of sands, mineral aggregates, etc.

All work of this office has been kept current and is current to date.

Very respectfully,

J. O. HARGROVE,  
*Inspector of Asphalts and Cements.*

ASSISTANT TO ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA.

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## Total number of samples tested.

Asphalts:	
Aztec.....	54
Bermudez.....	2
Lake Trinidad (refined).....	1
Montezuma.....	24
Texaco.....	1
Lake Trinidad (crude).....	1
Asphalt mixtures:	
Binder.....	45
Cement (binder).....	126
Cement (topping).....	147
Cement (District of Columbia asphalt plant).....	206
Topping mixtures.....	356
Concrete mixtures.....	40
Topping (old surface material).....	6
Cement, Portland.....	9,423
Oils:	
Flux.....	2
Fuel.....	6
Residuum.....	2
Road.....	11
Pitch, paving.....	3
Sands.....	117

Stone:			
Binder.....			132
Limestone dust.....			49
Trap-rock screenings.....			6
Limestone screenings.....			2
Miscellaneous.....			183
Total.....			10,945

**ASPHALTS.**

Chemical and physical examination of asphalts used in laying and repairing of pavements in the District of Columbia shown in the following tables:

From Cranford Paving Co.:

- 41 samples Aztec, refined, representing 1,225 tons.
- 2 samples Bermudez, refined, representing 55 tons.
- 1 sample Trinidad asphalt, refined, representing 25 tons.

	Aztec.	Bermudez.	Lake Trin- idad asphalt, refined.
Penetration:			
At 32° F.....	20		
At 77° F.....	54	25	
At 115° F.....	215		
Bitumen soluble in CS.....per cent.	99.78	93.73	54.35
Organic matter insoluble.....do.....	.05	1.85	9.71
Ash.....do.....	.17	4.41	35.94
Specific gravity at 60° F.....	1.029	1.068	
Ductility at 77° F.....	89	35	
Penetration before heating.....	54	25	
Penetration after heating 300° F., 7 hours.....	47	22	
Asphalt cement hardens.....per cent.	14.3	11.66	
Asphalt cement loosens.....do.....	.14	1.56	

From municipal asphalt plant:

- 13 samples Aztec, refined, representing 459 tons.

	Aztec.	Aztec.	
Penetration at 77° F.....	53	Penetration before heating.....	53
Bitumen soluble in CS.....per cent.	99.74	Penetration after heating 300° F., 7 hours.....	46
Organic matter insoluble.....do.....	.17	Asphalt cement hardens.....per cent.	14.76
Ash.....do.....	.17	Asphalt cement loses.....do.....	.07
Specific gravity at 60° F.....	1.059	Flash (°F.).....	505
Ductility at 77° F.....	77	Burns (°F.).....	596

From Warner-Quinlan Asphalt Co.:

- 24 samples Montezuma, refined, representing 863 tons.

	Monte- zuma.	Monte- zuma.	
Penetration:			
At 32° F.....	20	Specific gravity at 60° F.....	1.045
At 77° F.....	55	Ductility at 77° F.....	90
At 115° F.....	243	Penetration before heating.....	55
Bitumen soluble in CS.....per cent.	99.85	Penetration after heating 300° F., 7 hours.....	47
Organic matter insoluble.....do.....	.05	Asphalt cement hardens.....per cent.	14.07
Ash.....do.....	.13	Asphalt cement loses.....do.....	.20

## ASPHALT CEMENT.

Tables showing penetration results of asphalt cements used in asphalt binder, block, concrete, and topping used by the contractors and municipal asphalt plant:

[Penetration at 77° F.]

	Cranford Paving Co.			Cranford Paving Co.	
	Aztec.			Aztec.	
	Binder.	Topping.		Binder.	Topping.
Number of samples.....	71	73	Number of samples—Cont.		
Highest test:			Average of all samples		
Office.....	62	61	tested:		
Yard.....	61	61	Office.....	55	54
Lowest test:			Yard.....	55	55
Office.....	48	50			
Yard.....	50	50			
	Municipal asphalt plant.			Municipal asphalt plant.	
	Standard.	Aztec.		Standard.	Aztec.
Number of samples.....	38	202	Number of samples—Cont.		
Highest test:			Average of all samples		
Office.....	61	58	tested:		
Yard.....	-----	-----	Office.....	55	48
Lowest test:			Yard.....	-----	-----
Office.....	49	42			
Yard.....	-----	-----			
	Warner-Quinlan Asphalt Co.			Warner-Quinlan Asphalt Co.	
	Montezuma.			Montezuma.	
	Binder.	Topping.		Binder.	Topping.
Number of samples.....	55	74	Number of samples—Cont.		
Highest test:			Average of all samples		
Office.....	60	61	tested:		
Yard.....	60	60	Office.....	53	53
Lowest test:			Yard.....	54	54
Office.....	48	48			
Yard.....	49	49			

## BINDER STONE.

During the year there were examined 132 samples of binder stone used in the laying and making repairs to asphalt pavements, representing 8,624 cubic yards, with no rejections.

	Samples received.	
	Number.	Cubic yards.
Cranford Paving Co.....	44	5,060
Warner-Quinlan Co.....	88	3,564

## ASPHALT BINDER MIXTURE.

Analysis of 11 samples taken from the Cranford Paving Co. and 34 samples taken from the Warner-Quinlan Co. showed the average of bitumen soluble in carbon bisulphide as follows:

	Number of sam- ples.	Bitumen solu- ble in carbon bisulphide.
Cranford Paving Co.....	11	3.8
Warner-Quinlan Co.....	34	3.6

## ASPHALT TOPPING MIXTURES.

During the year there were 356 samples collected from the Cranford Paving Co., municipal asphalt plant, and Warner-Quinlan Asphalt Co. for examination and analysis. The following tables show the maximum, minimum, and average per cent bitumen contained and the average mesh composition of mineral aggregate used.

	Number of sam- ples.	Per cent bitumen.		
		Highest.	Lowest.	Average.
Cranford Paving Co., Aztec.....	72	12.2	10.3	11.3

*Mesh composition of aggregate.*

Retained on sieve having—	Per cent.
20 mesh per linear inch.....	3.4
40 mesh per linear inch.....	23.2
60 mesh per linear inch.....	29.5
80 mesh per linear inch.....	16.8
100 mesh per linear inch.....	7.6
Passing 100 mesh per linear inch.....	19.5

	Number of sam- ples.	Per cent bitumen.		
		Highest.	Lowest.	Average.
Municipal asphalt plant:				
Aztec.....	184	12.3	8.1	9.3
Standard.....	22	10.2	8.1	9.3

## SAND USED IN SURFACE MIXTURE.

Of this material, 92 samples, representing 13,001 cubic yards, were inspected, of which 3,095 cubic yards were rejected on account of coarseness and excessive percentage of mud.

	Number of samples.	Cubic yards accepted.	Cubic yards rejected.
Cranford Paving Co.....	40	2,720	3,095
Municipal asphalt plant.....	25	2,579	.....
Warner-Quinlan Asphalt Co.....	27	4,607	.....

## PETROLEUM RESIDUUM.

Residuum used during the year by the contractors in the preparation of asphalt cement was the product of the Standard Oil Co. Two samples were submitted by the contractor for test and examination, which showed the following:

	Samples.	Pounds.
Washington Asphalt Block & Tile Co. ....	2	128,640
<b>Specific gravity:</b>		
Highest.....		0.9429
Lowest.....		.9452
Average.....		.9440
<b>Gravity (Be':)</b>		
Highest.....		18.5
Lowest.....		18.1
Average.....		18.3
<b>Flash (°F.):</b>		
Highest.....		420
Lowest.....		375
Average.....		398
<b>Burns (°F.):</b>		
Highest.....		485
Lowest.....		470
Average.....		477
<b>Loss at 400° F. for 7 hours, per cent:</b>		
Highest.....		1
Lowest.....		1
Average.....		1

*Mesh composition of aggregate used in mixture.*

Retained on sieve having—	Per cent.
1/4-inch mesh.....	5.7
8 mesh per linear inch.....	10.2
10 mesh per linear inch.....	2.3
20 mesh per linear inch.....	7.2
40 mesh per linear inch.....	24.8
60 mesh per linear inch.....	24.9
80 mesh per linear inch.....	7.9
100 mesh per linear inch.....	4.5
Passing 100 mesh per linear inch.....	12.5

	Number of samples.	Per cent bitumen.		
		Highest.	Lowest.	Average.
Warner-Quinlan Co., Montezuma .....	78	12.4	9.9	10.7

*Mesh composition of aggregate used in mixture.*

Retained on sieve having—	Per cent.
20 mesh per linear inch.....	2.6
40 mesh per linear inch.....	20.1
60 mesh per linear inch.....	25.4
80 mesh per linear inch.....	17.2
100 mesh per linear inch.....	8.9
Passing 100 mesh per linear inch.....	25.8

## LIMESTONE DUST USED IN SURFACE MIXTURE.

This material is used as a filler to reduce the void in the sand used in asphalt surface mixtures and crushed stone in block mixtures. During the year there were examined 49 samples, all of which passed the required degree of fineness, i. e., all to pass the 30 and not less than 85 per cent to pass the 100-mesh sieve.

	Samples.	Tons.
Cranford Paving Co.....	16	400
Municipal asphalt plant.....	7	210
Washington Asphalt Block & Tile Co.....	10	275
Warner-Quinlan Asphalt Co.....	16	400

## ASPHALT FLUX (MONTEZUMA).

All flux used during the year by the contractors in the preparation of asphalt cement was the product of the Warner-Quinlan Asphalt Co. A total of three samples were submitted by the contractor for test and examination which showed the following:

	Samples.	Pounds.
Warner-Quinlan Asphalt Co.....	3	39,136

## Specific gravity:

Highest.....	1.03
Lowest.....	.9223
Average.....	.994
Gravity ( $\text{Be}'$ ):	
Highest.....	4.1
Lowest.....	21.6
Average.....	9.97

Flash ( $^{\circ}$  F.):

Highest.....	460
Lowest.....	310
Average.....	410

Burns ( $^{\circ}$  F.):

Highest.....	575
Lowest.....	410
Average.....	515

Loss at 300 $^{\circ}$  F. for 7 hours:

Highest.....	5.98
Lowest.....	0.0
Average.....	2.26

## ASPHALT SURFACE MIXTURE (ASPHALT CONCRETE), MUNICIPAL ASPHALT PLANT.

During the year there were examined 46 samples of asphalt concrete, representing about 1,813 cubic yards. This material was a mixture composed of trap-rock screenings, 46 per cent; building sand, 43 per cent; limestone dust, 4 per cent; and asphalt cement, 7 per cent (penetration at 77 $^{\circ}$  F., 100 grams, 5 seconds, 50). The average mesh composition of this mineral aggregate is shown in the table below. The stone, sand, and limestone dust were heated to a temperature of about 350 $^{\circ}$  F. in the heating drum of a Warren portable asphalt mixer. The hot asphalt was added and the whole thoroughly mixed for about five minutes. It was then discharged into carts and hauled to the site of work, which consisted principally of repairs to asphalt pavements. Examination of the material produced showed an average of bitumen soluble in carbon bisulphide 7.3 per cent.

*Mineral aggregate mesh composition.*

Retained on sieve—	Per cent.
1-inch mesh.....	0.0
1/2-inch mesh.....	6.0
8 mesh per linear inch.....	17.8
10 mesh per linear inch.....	4.4
20 mesh per linear inch.....	11.8
40 mesh per linear inch.....	23.7
60 mesh per linear inch.....	20.0
80 mesh per linear inch.....	5.4
100 mesh per linear inch.....	3.0
Passing 100 mesh per linear inch .....	7.9

**ASPHALT SURFACE MIXTURE TOPPING MUNICIPAL ASPHALT PLANT.**

There were examined 206 samples of topping mixture, representing about 4,956 cubic yards. This material was a mixture composed of old asphalt surface mixture (topping and binder), which, after being removed from the street, was hauled to the municipal asphalt plant and crushed in a Noyes rotary crusher to a fineness ranging from 1 inch to dust. To this material were then added trap-rock screenings, fine sand, limestone dust, and asphalt cement about the following proportions: Old asphalt surface material, 66 per cent; fine sand, 29 per cent; limestone dust, 2 per cent; and asphalt cement, 3 per cent (penetration at 77° F., 5 seconds, 100 grams, 51), the whole being mixed as above described under asphalt concrete and used for the same purpose.

The following are results of tests showing percentage of asphalt and mesh composition of mineral aggregate of old asphalt surface material and topping mixture after production:

*Old asphalt surface mixture (after crushing).*

Bitumen soluble in carbon bisulphide.....	Per cent.
.....	7.5

*Mineral aggregate mesh composition.*

Retained on—	Per cent.
1/2-inch mesh.....	7.5
1/4-inch mesh.....	8.0
1/8-inch mesh.....	19.7
8 mesh per linear inch.....	15.0
10 mesh per linear inch.....	2.2
20 mesh per linear inch.....	4.4
40 mesh per linear inch.....	12.1
60 mesh per linear inch.....	13.7
80 mesh per linear inch.....	5.4
100 mesh per linear inch.....	3.0
Passing 100 mesh per linear inch .....	9.0

*Topping mixture after production.*

Bitumen soluble in carbon bisulphide.....	Per cent.
.....	9.3

*Mesh composition mineral aggregate.*

Retained on—	Per cent.
1/4-inch mesh.....	5.7
8 mesh per linear inch.....	10.2
10 mesh per linear inch.....	2.3
20 mesh per linear inch.....	7.2
40 mesh per linear inch.....	24.8
60 mesh per linear inch.....	24.9
80 mesh per linear inch .....	7.9
100 mesh per linear inch.....	4.5
Passing 100 mesh per linear inch .....	12.5

## ASPHALT BLOCK.

About 214,900 paving block manufactured by the Washington Asphalt Block & Tile Co. were used in the paving of avenues, streets, and alleys in this city during the year, in the manufacture of which there was used Trinidad Lake asphalt fluxed with petroleum residuum and Trinidad Lake asphalt 65 parts, Texaco 35 parts fluxed with petroleum residuum and a mineral aggregate composed of Potomac granite, trap rock, limestone screenings, and limestone dust.

## ASPHALT CEMENT.

Lake Trinidad and Texaco.		Lake Trinidad and Texaco.
Bitumen soluble in carbon bisulphide.....	74.47	Per cent of loss after heating 300° F. for
Penetration at 77° F., 100 grams.....	20	7 hours.....
Per cent of hardening after heating 300° F., 7 hours.....	5.0	Brittleness in centimeters, drop of 25-gram weight at 32° F.....

## BLOCK.

Specific gravity.....	2.434
Bitumen soluble in carbon bisulphide.....	per cent.. 6.9

*Mesh composition of mineral aggregate.*

	Per cent.
Retained on $\frac{1}{4}$ -inch mesh sieve.....	0.0
Retained on 20 mesh per linear inch.....	55.30
Retained on 100 mesh per linear inch.....	21.77
Passing 100 mesh per linear inch.....	22.93

## HYDRAULIC CEMENTS.

*Number of barrels inspected and the average results of tests on same—Portland cement.*

	Nazareth.	Security.	Tide-water.	Vulcanite.
Number of barrels.....	2,480	8,575	68,580	11,605
Number of samples.....	248	857	6,858	1,460
Fineness passing 100-mesh sieve.....	per cent.	98.4	95.9	95.5
Fineness passing 200-mesh sieve.....	do.	86.9	80.8	79.5
Initial set (hours and minutes).....	3-15	3-30	4-35	5-50
Hard set (hours and minutes).....	4-35	5-15	6-40	7-40
Per cent water used:				
Neat cement.....	24.0	22.6	22.0	22.6
3 parts Ottawa sand.....		10.2	10.2	10.2
Temperature of air and water.....	82	79	77	76
Tensile strength in pounds per square inch:				
Neat—				
1-day.....	450	399	390	330
7-day.....		657	763	78
28-day.....			748	.....
Sand (1.3)—				
7-day.....		271	303	331
28-day.....			378	.....
Specific gravity.....	3.162	3.154	3.172	3.182

In the testing of cement, samples are taken from 10 barrels of each 100-barrel lot and tested individually. The 9,423 samples tested represent 94,240 barrels, with no rejections.

*Number of barrels of cement tested and by whom submitted.*

Cranford Paving Co., Vulcanite.....	14,605
District of Columbia:	
Nazareth.....	2,480
Security.....	3,000
Tidewater.....	64,030
	—————
Murray, W. D. (canal wall), Tidewater.....	325
Warner-Quinlan Asphalt Co.:	
Tidewater.....	4,225
Security.....	5,400
	—————
Evarts Street Bridge, Security.....	175
Total.....	94,240

## REPORT OF THE SURVEYOR.

WASHINGTON, October 2, 1917.

SIR: I have the honor to submit the following report concerning the work of this office, including the extension of streets and avenues (see separate report of the assistant surveyor herewith), for the year ended June 30, 1917:

## PRIVATE SURVEYS, OR SURVEYS FOR WHICH A FEE IS CHARGED.

This work is for private citizens, corporations, etc., for which a fee is charged in accordance with a schedule of fees prescribed by the commissioners.

The Code directs that this class of work shall be executed by the surveyor.

The total amount of money collected for this work during the past year was \$14,193.32. This is a slight decrease as compared with that of the previous year, but the records show that the number of surveys made was greater. The decrease in revenue is probably due to the size and character of the surveys made.

Over 3,000 individual orders were left for work.

The new lots created by subdivision were 2,397, an increase of 358 over the previous year.

The class of work for which a fee is charged consists of surveying lots for building purposes, locating all new buildings under construction, and determining their location with respect to party lines, public streets, and alleys, etc., determining party and property lines, surveying improved and unimproved property to determine accurate areas and for description in drawing deeds, assessments, etc., the subdividing of property into lots, blocks, streets, etc., and the drawing of various kinds of plats as required by the regulations of the commissioners.

## SURVEYS FOR THE FEDERAL AND DISTRICT GOVERNMENT.

In addition to the work previously mentioned, this office makes surveys for the Federal Government and the District of Columbia. This work has substantially increased over that of the past year, and from a record kept in the office, based on the same system by which private work is estimated, the total cost of this work amounted to \$9,807.

This class of work consists of giving lines for streets and alleys in connection with the improvement of the same, surveys for schools and engine houses, locating encroachments on public space, surveys in connection with complaints of various kinds, surveys for the assessor's office to determine the location of buildings with respect to lots, surveys made in connection with condemnation cases for streets, alleys, and parks, and much work that is required for official use when called for by public officials.

The following table is submitted as a matter of comparison and convenience. It will show the relation of the work for the past year with that of the previous year:

	Fiscal year 1915-16.	Fiscal year 1916-17.
<b>FOR PRIVATE PARTIES.</b>		
Individual lots or parts of lots surveyed in city and county.....	2,160	1,889
Certificates of survey issued covering one or more lots.....	1,014	1,096
Duplicates of above recorded in survey certificate books.....	1,014	1,096
Separate surveys made to verify walls.....	941	844
Postal-card reports concerning walls to owners.....	941	844
Individual buildings inspected as to location of new walls.....	1,741	1,564
Large tracts in county surveyed, subdivided, and recorded.....	11	7
Outline surveys in county of unsubdivided tracts.....	21	20
Subdivision plats prepared in duplicate.....	360	271
Duplicate subdivisions prepared for assessor.....	360	271
Subdivisions recorded.....	356	247
Total of individual new lots in subdivisions.....	2,039	2,397
Plats of one or more recorded lots to accompany applications for building permits (commonly called "building plats") in duplicate.....	1,191	900
Plats made under regulations for theaters, stables, motors, etc.....	207	289
Estimates of cost issued in triplicate.....	3,756	3,222
Plats made up on order of private parties.....	2,894	2,673
Total of fees paid to collector of taxes by private parties.....	\$15,005.15	\$14,193.32
<b>FOR THE DISTRICT OF COLUMBIA.</b>		
Surveys for the District of Columbia.....	129	185
Plats recorded (condemnations, dedications etc.).....	61	42
Reports concerning walls to building inspector.....	916	806
Assessment and taxation plats recorded.....	218	219
<b>MISCELLANEOUS.</b>		
Total of surveys for the District of Columbia and private parties.....	2,116	2,114
Total of plats, public and private, including plats drawn in books.....	5,182	4,938

#### STREET EXTENSIONS.

Attached to this report is report of the assistant surveyor for the year ended June 30, 1917, relating to the matter of street, alley, and park condemnations.

Seventeen cases have been confirmed during the past year, and there are now pending in court 29 cases. The amount of damages awarded in the cases confirmed was \$317,338.42. Of course this amount is distributed as benefits, as required by law.

The table herewith shows the status of each case which is now in court, and those confirmed during the year. The office has several street and alley extension cases under consideration and will be able to report upon them soon.

Some very large condemnation cases have been prepared and filed during the past year; and there are a number of large condemnation cases still pending in court, Wisconsin Avenue being the most important one.

#### PARKS.

In connection with the appropriation of \$25,000 for the acquisition of small parks at street intersections, I have to call your attention to the provisions of the law which specifies that these parks must be entirely surrounded by streets, and must be acquired in accordance with a map on file in this office.

Practically all of the available parcels have been exhausted, and unless the law is amended the appropriation will be of no purpose, and it is earnestly recommended that the law be amended, giving the commissioners power to select the parcels in accordance with their best judgment. It frequently occurs that those shown on the map, and completely surrounded by streets, as set forth by the act, are improved by buildings, which renders their acquisition undesirable.

These small parks add much to the attractiveness of the city, and their acquisition should be continued. Often unsightly structures are constructed at these street intersections, and the commissioners should have ample authority to acquire them for park purposes whenever it is in the public interests. The percentage of these parks within the original city limits is far in excess of those outside of the original city, and it is strongly recommended that the commissioners take the necessary steps to have this law amended.

In connection with the larger parks, I wish to invite your attention to two which it seems to me should be given especial consideration at this time, namely, Piney Branch Parkway and Klingle Road Park.

The present Piney Branch Parkway from Rock Creek to Sixteenth Street should be extended to municipal hospital. This parkway has the approval of the Columbia Heights 'citizens' Association, and many citizens of that community. Both parks mentioned are provided for in the park commission's plan of 1901.

If the land is not acquired for these parks soon, development will destroy them for park purposes. They both contain magnificent trees, and their topography makes them especially desirable for this purpose. Especially is the Piney Branch Parkway case urgent, as dumping will soon destroy the natural attractiveness of this valley.

If these parks were acquired and their limits determined, development would be much more rapid, and the status of the street plan would be established.

It is earnestly recommended that the commissioners include these parks in their estimates to Congress.

#### CLOSING OLD HIGHWAYS.

Some provision should be made for closing old highways or public roads as they become useless by being abandoned because of the opening of new and more direct highways. At present there is no authority to close these roads either by sale or exchange. Some provision should be made, so that in the event that other highways are opened in accordance with the highway plan, the commissioners may exchange or sell the old useless roads or highways. These abandoned roads are often a hindrance to the proper development of the section through which they pass, and sometimes become in a dangerous condition, and the commissioners should be relieved of their responsibility after they become useless.

#### OPENING HIGHWAYS AND ALLEYS THROUGH PUBLIC PROPERTY.

It is believed that the commissioners should have authority to open streets and alleys through property owned by the District, whenever it is thought not to be detrimental to the interest for which the property was acquired.

It is further recommended that the commissioners secure legislation to permit the opening of Seventh Street through the property of the St. Elizabeth Asylum at its intersection with Nichols Avenue. This would afford a more direct access to Congress Heights, with a very small loss of ground to the insane asylum.

#### OPENING NEW HIGHWAYS.

It is believed that Colorado Avenue from its present terminus near Thirteenth Street should be extended to Georgia Avenue, and that Thirteenth Street should be opened from its present northern terminus north to Colorado Avenue, and that Piney Branch Road should be opened from Thirteenth Street to the Blair Road; and that Nicholson Street should be opened from Colorado Avenue to Sixteenth Street.

The commissioners have authority to do this under the present law, but the entire cost of the land would have to be assessed as benefits.

These streets are main arteries, and as such are for the general public, and can not be considered locally. The land generally is in small holdings, and the land would be cut to a great disadvantage; besides there are a number of improvements within the limits of the proposed streets. I am of the opinion that no jury would ever be able to find benefits equal to the damages, and as time goes on, improvements will increase as well as the value of the land, making the acquisition of them more expensive. There is at present a public need for the opening of these highways, and the sooner it is done the better it will be with respect to the cost and for the public convenience.

It is recommended that the commissioners be authorized to amend the highway plan so that the cost may be reduced to a minimum, and that they be directed to institute condemnation proceedings in accordance with the amended plan.

An item is being prepared which it is recommended that the commissioners include in their estimates to Congress. This provides that not less than one-half of the cost of the land and the court proceedings shall be assessed as benefits.

#### ORIGINAL DISTRICT BOUNDARY STONES.

There is quite a movement toward preserving the original District boundary stones, and much good has been accomplished by the Daughters of the American Revolution in fencing these stones to preserve them from relic hunters.

These boundary stones mark the line between the jurisdictions of Maryland and the District of Columbia, and are planted at a one-mile interval along the boundary.

They were planted about 1793, and are of considerable historic interest, in addition to being valuable as survey monuments. The fences surrounding them, as constructed by the Daughters of the American Revolution, are upon private ground. The commissioners or this organization have no authority to erect these fences without the consent of the property owners upon whose land the monuments are erected. It is believed that a small appropriation should be made to purchase sufficient land to erect these fences so that there will be no trespass, and that there should be a small appropriation for the construction of iron fences to inclose these old monuments.

The work in the office for the past year has been performed by the employees in a capable manner, and the office is fortunate in having on its rolls men who are able to perform this scientific work rapidly and accurately.

Very respectfully,

M. C. HAZEN,  
*Surveyor, District of Columbia.*

ASSISTANT TO THE ENGINEER COMMISSIONER.

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#### STREET EXTENSION DIVISION.

WASHINGTON, D. C., September 28, 1917.

SIR: I have the honor to submit herewith report on the operation of the street extension division for the year ended June 30, 1917.

During the year 21 street, alley, and park condemnation cases were prepared and filed. A number of important cases filed during the previous year, action on which was delayed, have been finally disposed of, notably: Thirteenth Street between Spring Road and Colorado Avenue, Georgia Avenue, Calvert Street and Cleveland Avenue, Benning Road east of Anacostia River.

Submitted herewith is a table showing action on all condemnation cases filed during the year, and action on cases previously filed where such cases were not finally disposed of prior to July 1, 1916.

Very respectfully,

J. B. SHINN,  
*Assistant Surveyor, District of Columbia.*

The SURVEYOR.

## Condemnation cases.

## STREET EXTENSIONS AND PARKS.

Location.	Court docket No.	Act approved—	Case filed.	Verdict filed.	Verdict.		Remarks.
					Damages.	Benefits.	
Road and park along Anacostia River.....	1049	May 10, 1910	Nov. 25, 1912	do .....	.....	.....	Continuation of condemnation proceeding under consideration by Commissioners order proceeding dismissed Aug. 3, 1916.
Establishment of building restriction line south side Park Road and north side Kenyon Street, both between Thirteenth and Fourteenth Streets.....	1050	.....	.....	.....	.....	.....	Discontinued. New case filed.
Widening Benning Road west of Anacostia River.....	1107	.....	Apr. 21, 1914	Oct. 20, 1916	\$79,942.36	\$81,724.89	Verdict confirmed Feb. 21, 1917.
Widening Georgia Avenue.....	1110	.....	June 30, 1914	July 21, 1916	10,200.00	10,684.63	Verdict confirmed Sept. 20, 1916.
Extension of Girard Street, square 2669,.....	1122	.....	Oct. 9, 1914	.....	.....	.....	Commissioners directed to suspend proceeding until further action by Congress. (District of Columbia appropriation act approved Mar. 3, 1917.)
Extension of Girard Street, square 2669,.....	1239	.....	Oct. 20, 1915	.....	.....	.....	Objections to verdict sustained.
Cathedral Avenue and Woodley Road.....	1247	.....	Aug. 6, 1915	Mar. 30, 1916	4,525.96	5,048.76	New jury summoned for Oct. 9, 1917.
Central Avenue between Rhode Island Avenue and Brentwood Road.....	1249	.....	Aug. 16, 1915	July 13, 1916	68,425.33	69,765.45	Verdict confirmed Mar. 26, 1917.
Thirteenth Street between Spring Road and Colorado Avenue, and adjacent streets.....	1257	.....	Nov. 11, 1915	June 29, 1916	13,035.03	7,036.41	Verdict confirmed Aug. 4, 1916.
Parks—squares 5574, 5575, V-2623, 3003, 2924, 2927, 1725, 1833, 1884, 5531, and 1247.	1260	.....	Dec. 15, 1915	May 17, 1916	13,455.55	14,409.68	Verdict confirmed July 5, 1916.
Wisconsin Avenue, between Garfield Street and District of Columbia line.	1266	.....	Feb. 4, 1916	.....	.....	.....	Hearing concluded and case given to jury Feb. 2, 1917.
Naylor Road between Good Hope and District of Columbia line.	1267	.....	Feb. 28, 1916	June 29, 1916	5,100.75	5,514.16	Verdict confirmed Aug. 9, 1916.
Calvert Street and Cleveland Avenue.....	1268	.....	do .....	May 4, 1917	107,439.90	108,135.00	Verdict confirmed June 21, 1917.
Porter Street, squares 3515 and 3516,.....	1269	.....	do .....	do .....	.....	.....	Continued to June 29, 1917.
First Street N.E., between Florida Avenue and Q Street, and V Street NW, between Florida Avenue and Second Street.	1277	.....	May 9, 1916	.....	.....	.....	Hearing concluded and given to jury May 18, 1917.
Building restriction line, Park Road and Mt. Pleasant Street, square 2612.	1279	.....	Sept. 27, 1916	.....	.....	.....	Continued to Oct. 2, 1917.
Building restriction line, Columbia road, square 2536, Reno Road, Maconab Street to Klinge Ford Road.....	1280	.....	Nov. 1, 1916	.....	.....	.....	Dismissed by order of court June 5, 1917.
Seventeenth Street NW, Irving Street to Kenyon Street, Montague Street east of Sixteenth Street NW.....	1281	Sept. 1, 1916	Nov. 22, 1916	June 8, 1917	5,178.33	5,577.03	Verdict not yet confirmed.
Porter Street, square 1726,.....	1283	do .....	do .....	May 29, 1917	.....	Verdict confirmed June 8, 1917.	
Kenyon Street NW, Seventeenth Street to Mount Pleasant Street,	1287	do .....	do .....	June 21, 1917	.....	Verdict not yet confirmed.	
Pleasant Street,	1288	Sept. 1, 1916	Nov. 28, 1916	.....	.....	Continued to Oct. 5, 1917.	

Dismissed by order of commissioners  
Apr. 13, 1917.

Continued to Oct. 10, 1917.  
Do.

Continued to Apr. 12, 1917.  
Do.

Colorado Avenue, Montague Street to Georgia Avenue, .	1291	.....	Mar. 1, 1917	.....	.....
Rhode Island Avenue, South Dakota Avenue to District of Columbia line, .	1293	.....	Mar. 16, 1917	.....	.....
Shannon Place S.E., square 5772, .	1294	.....	Mar. 13, 1917	.....	.....
Oak Street N.W., from present terminus to Fourteenth Street.	1295	.....	do.	.....	.....
Widening Benning Road west of Anacostia River	1296	.....	Mar. 26, 1917	.....	.....
Highway and Park along Anacostia River, parcels 211/4 and 211/7.	1297	.....	do.	.....	.....
Building restriction line, Newton Street N.W., between Sixteenth and Seventeenth Streets.	1303	.....	Apr. 14, 1917	.....	.....
Minor Street in Keating estate, squares 3526 and 3530, .	1305	.....	May 14, 1917	.....	.....

### Condemnation cases.

#### ALLEYS

Location.	Court docket No.	Case filed.	Verdict filed.	Damages.	Verdict.	Remarks.
Square 2877.	1252	Sept. 24, 1915	Mar. 30, 1916	\$1,898.75	\$2,065.00	Verdict confirmed Sept. 25, 1916.
Square 3935.	1252	do.	do.	689.00	2,822.50	Do.
Square 2340.	1252	do.	do.	451.75	3,725.00	Do.
Square 2875.	1252	do.	do.	3,021.00	3,191.00	Do.
Square 2662.	1261	Jan. 28, 1916	Aug. 4, 1916	725.25	865.35	Verdict confirmed Nov. 10, 1916.
Square 3445.	1261	do.	do.	505.00	645.10	Do.
Square 3114.	1262	do.	do.	1,072.84	1,212.94	Do.
Square 1033.	1262	do.	do.	933.20	1,183.60	Do.
Square 1053.	1282	do.	do.	99.83	325.23	Do.
Square 3455.	1284	Nov. 22, 1916	June 21, 1917	.....	.....	Not yet confirmed.
Square 3151.	1285	do.	do.	May 31, 1917	.....	.....
Square 2571.	1286	do.	do.	.....	.....	.....
Square 2936.	1290	Mar. 1, 1917	do.	.....	.....	.....
Square 3120.	1290	do.	do.	.....	.....	.....
Square 674.	1316	June 12, 1917	.....	.....	.....	.....
Square 2718.	.....	.....	.....	.....	.....	.....

## REPORT OF THE SUPERINTENDENT OF TREES AND PARKINGS.

WASHINGTON, D. C., August 20, 1917.

SIR: I have the honor to submit my first annual report dealing with the operations of the trees and parkings office for the fiscal year ended June 30, 1917.

## TREES PLANTED, REMOVED, AND SPRAYED.

The systematic planting of young trees to their permanent positions on the streets again continued to be the most important feature of our work, the necessity being recognized to shade all improved streets as rapidly as the surface conditions justify it. Our efforts along these lines resulted in the transplanting of 2,492 young trees to their permanent position on the streets. Of the number planted 2,474 were set at the curb line, 9 in the parking between the inner edge of the sidewalk and the building line. In addition 6 were planted in the Wallach-Towers playgrounds, 2 in central parking on Fourteenth Street NW. between Montague Street and Park Avenue, and 1 in the interior park in square 989—Eleventh and Twelfth, East Capitol and B Streets SE. Owing to the vicissitudes of the weather, a decrease of 929 trees is noted in this work as against last year's record, which was 3,421 trees; 1,620 trees were set out during the fall planting season and only 872 in the spring. It was impossible because of weather conditions to prepare tree holes during the winter months, and a great falling off is shown in the number of trees planted during the spring.

During the year 2,121 trees were removed for various reasons. There was an increase of 25 trees over the number removed the previous year. The trees removed in the northwest section of the city during the first half of the year have been replaced. Attention is called to the fact that the old silver maples and a few scattered sycamore trees were removed from both sides of Ninth Street NW. between G Street and New York Avenue, and replaced with red oaks. The remaining trees on Ninth Street NW. from New York Avenue to Florida Avenue should be removed and replaced with trees of better varieties as soon as funds can be spared for the purpose. The ash, negundo, and sycamore trees were removed from both sides of P Street NW. between Eleventh Street and Iowa Circle and replaced with red oaks, the negundo trees on B Street NE. between Massachusetts Avenue and Eleventh Street were removed and replaced with Norway maples, the negundo and silver maple trees on D Street NE. between First and Second Streets were removed and replaced with red oaks, the Carolina poplars and sycamore trees on P Street NW. between North Capitol and First Streets were removed and replaced with red oaks, and the silver maple trees on E Street NW. between Eighteenth and Nineteenth Streets were removed and replaced with pin oaks.

Spraying operations were started at the beginning of the fiscal year and continued up to the 18th of July, the insects having ceased their depredations about this time; therefore no spraying was undertaken until May 9 last. The elm trees throughout the city were sprayed first to prevent their defoliation, and it was deemed advisable to undertake this work before the insects made their appearance.

At the time the spraying of the elm trees had been completed it was thought best to spray all trees on the streets with the exception of Carolina poplars, gingkos, tulip poplars, and honey locusts to prevent their defoliation, and the work was undertaken. At the close of the fiscal year approximately three-fourths of the best trees on the streets had been sprayed. Their foliage is in good condition and I would state that very few complaints have been received at this office in reference to insects during the past spring.

Many of the red and pin oaks, Norway and sugar maples, and oriental plane trees on the streets are badly affected with scale insect. This office applied lime sulphur with brushes for scale insect on 3,237 pin oak and 809 red oak trees from January 6 to March 26 last.

Two Fitzhenry-Guptill Co.'s Standard AA sprayers were purchased last spring. We now have four high-power spraying machines, and are well equipped to cover the entire tree-planted district in a short time. The total cost of these machines was \$3,000.

The following statement shows the number and varieties of trees planted, removed, and sprayed during the year:

Variety.	Planted.	Removed.	Sprayed.
Aceria.		2	
Ailanthus.		3	
Althea.		1	
Apple.		1	
Ash.	2	30	644
Catalpa.		15	24
Cedar.		7	
Cherry, wild.		2	
Chestnut.		2	
Chestnut, horse.		1	147
Elm.	200	107	11,182
Ginkgo.	37	15	
Gum:			
Black.		1	
Sweet.			86
Linen.	41	93	6,953
Locust:			
Honey.		27	285
Yellow.		26	
Maple:			
Norway.	756	321	12,768
Red.		19	3,417
Silver.	3	377	20,037
Sugar.	170	146	2,725
Sycamore.		5	151
Mulberry.		6	
Negundo.		142	348
Oak:			
Chestnut.		3	
Pin.	300	62	2,667
Pyramidal.		1	84
Reel.	429	72	1,607
White.		7	
Willow leaf.	73		26
Osage orange.		10	
Pau lownia.		1	
Pine.		2	
Poplar:			
Aspen.		12	1
Athenian.		11	
Carolina.		262	445
Tip.	1	9	676
Sycamore, i. e., oriental plane.	480	319	11,600
Willow.		1	
Total.	2,492	2,121	75,873

The planting, removal, and spraying of the above trees was paid for as designated below:

	Streets, District of Columbia, 1917, parking commis- sion.	Appropri- ations for other depart- ments.	Whole cost deposits.
Planting.	2,343	60	89
Removal.	1,774	315	32
Spraying.	75,873		

Of the 2,121 trees removed during the year, 1,280 were dead, decayed, and dangerous; 221 were of inferior and condemned varieties; 39, to relieve excessive shade; 346, because of street improvements; 57, for driveways; 13, because of interference with building operations; 15, improvements of alleys; 6, accidents; 66, storms; 11, to accommodate lamps; 35, injurious to trees at the curb; 30, injurious to private property; 2, close proximity to buildings.

It was ascertained that 39 trees were destroyed by illuminating gas, 7 by salt water, 62 by a normal moist supply. 3 by root mutilation, 11 by being girdled, 13 by being filled around, 1 by fire, 26 by frost, 2 by scale insects, and the remaining were unexplained.

One thousand nine hundred and one trees of the number removed stood at the curb line, 163 in the parkings, 38 in the sidewalk, 2 in the roadways, 16 in alleys, and 1 on private property.

## NURSERIES.

The E Street nursery, located on Reservation No. 13, in the Washington Asylum grounds, is well stocked with trees of all varieties considered best for street planting. The stock in the nursery rows at this nursery will furnish trees for street planting for from three to five years. The location of the new municipal hospital on this reservation will deprive this department of the greater part of the ground now being used for nursery purposes. An arrangement was effected in the early spring with the Board of Charities, and it was approved by the commissioners, whereby this office was allowed the use of the ground previously used for nursery purposes on the west side of Iowa Avenue NW., immediately north and south of the line of Webster Street and adjacent to the Tuberculosis Hospital; also an additional piece of ground south of Webster Street and adjoining the old nursery on the west was turned over to this office. It was deemed advisable immediately after the new plot of ground was obtained to transfer the recently planted seedlings from the nursery rows at the E Street nursery to the new plot. No seedlings were planted in the nursery rows at the E Street nursery.

The total number of seedlings planted at the new nursery was 6,714, and of this number 1,850 were Norway maples, 984 were sycamore maples, 937 were willow-leaf oaks, 600 were gingkos, 476 were American lindens, 1,341 were red oaks, and 476 were pin oaks.

## TRIMMING.

It has been impossible to undertake any general trimming of trees during the fiscal year, except to remove the low limbs which interfered with pedestrians and vehicular traffic. This work was undertaken in connection with the cultivation of young trees last summer. There has been an abundance of rain during the past spring, and at this time there are many low limbs throughout the city which should be removed. During the winter the Oriental plane, i. e., sycamore trees on Third Street SE., from East Capitol Street to the river, and the same variety on Seventh Street SE., between East Capitol Street and Pennsylvania Avenue, were severely pruned, topped off. I would state that these trees have put out new growth this spring, and at this time the appearance of the streets has been improved, the trees benefited, and in addition there is no complaint from the property owners because of excessive shade.

The old silver maple trees on Twelfth Street SW., between B and Water Streets were in very bad shape and were fast deteriorating. Many of these were dangerous to persons and property, especially during storms, because of many large dead limbs in them; all the dead wood was removed and the trees severely pruned. The treatment rendered these trees will stimulate growth and insure their life for a few years. In addition to the trimming on the streets mentioned it was necessary to keep a foreman and a small gang of men almost continually employed during the fiscal year on the trimming of trees at the request of individuals. A total of 33,543 trees were trimmed during the year.

## TREE SURGERY.

The work of treating the cavities in the trees on the streets was resumed in the early spring, and a force was kept continually employed on this work up to the close of the fiscal year. Four hundred and forty-one trees were treated, this being an increase of 331 trees over last year. The following shows the location, kind, and number of trees cemented:

Kind.	Curb.	Parking.
Acacia.....		
Chestnut, horse.....	1	
Elm.....	6	
Linden.....	264	155
Maples:		
Norway.....	4	
Silver.....	2	
Sugar.....	1	
Poplar, tulip.....	6	
Sycamore.....		
Total.....	284	157

## CULTIVATING YOUNG TREES, MOWING PARKINGS, AND REMOVING TREE BOXES.

At the beginning of the fiscal year nearly all the force was engaged in the mowing of weeds on parkings abutting unimproved property, also the cultivation of all young trees throughout the city, this work was carried on until the entire tree-planted streets had received this attention. An overgrowth of weeds on the parkings and in the tree spaces throughout the city spoils the good appearance of a street and many complaints are received each year before the entire city can be covered. The cultivation of young trees is a necessity to insure good growths, especially is this true in the case of recently planted trees. All trees planted during the fall and spring planting seasons have had the dirt lowered and loosened. These trees are all in good shape as the season has not been too hot or dry, and the loss from transplanting will be very slight. At the close of the fiscal year the forces of this department were engaged in cultivating all small trees, removing low limbs and tree boxes from the larger trees through the city, and this work will be prosecuted until the entire tree-planted district is covered.

One thousand nine hundred and nineteen wooden tree boxes and 89 iron guards were removed during the year from trees which no longer require their protection. The iron guards removed will be painted and can be used on other small trees requiring protection. The iron guards are more ornamental than the wooden boxes and while the cost is greater at first they are more economical taking in consideration the number of trees they can be used around. The wooden boxes can only be used around one tree.

## REGULATION OF TERRACES.

This office examined and issued 584 permits affecting terraces during the year. There has been a decrease in this work. This office was authorized at the beginning of the fiscal year to require an additional deposit in connection with building permits to guarantee that the parking permit issued by this department would be complied with. A few builders have started to violate their permits since then but the treatment of the parking was corrected promptly as soon as the fact was called to their attention.

## PAVING OF ABANDONED TREE SPACES.

The work of paving abandoned tree spaces throughout the city during the year was performed by the surface division, and the cost of the work paid from the appropriation for the parking commission. A total of \$1,760.63 was spent on this work.

## SUMMARY.

Curb trees on streets at close of fiscal year 1916 .....	104, 306
Net increase of curb trees during the fiscal year 1917.....	573
Curb trees on streets at close of fiscal year 1917.....	<u>104, 879</u>
Mileage of trees at close of fiscal year 1916 .....	592. 64
Increase of mileage of trees, fiscal year 1917.....	3. 26
Mileage of trees at close of fiscal year 1917 .....	<u>595. 90</u>
Mileage of tree-planted streets at close of fiscal year 1916 .....	296. 32
Increase of mileage of tree-planted streets at close of fiscal year 1917.....	1. 63
Mileage of tree-planted streets at close of fiscal year 1917 .....	<u>297. 95</u>

NOTE.—Mileage is figured on basis of 352 trees to the mile.

*Expenditures, streets, District of Columbia, 1917, parking commission.*

	Labor.	Material.
Planting trees.....	\$7, 173. 05	\$3, 002. 83
Removing dead, decayed, and dangerous trees.....	4, 282. 79	.....
Trimming trees.....	5, 664. 26	.....
Cultivating young trees planted on the streets.....	1, 701. 06	.....
Improvement, care, and mowing of parkings.....	1, 991. 78	170. 60
Extermination of insects.....	1, 860. 31	6, 370. 95
Clerical hire.....	2, 047. 82	.....

*Expenditures, streets, District of Columbia, 1917, parking commission—Continued.*

	Labor.	Material.
Maintenance of yard.....	\$2,302.77	
Maintenance of nursery and shops.....	5,772.38	\$196.59
Miscellaneous repairs to boxes, etc.....	411.24	
Tree surgery.....	615.76	108.72
Storm damage.....	97.58	
Holiday payments to laborers.....	285.50	
Removing wooden tree boxes and iron guards.....	447.15	
Filling low tree spaces.....	51.07	
Supervision and inspection.....	853.50	10.00
General repairs, sharpening tools, shoeing horses, wheelwright work, stable, and blacksmith supplies.....	741.14	311.90
Fuel.....	77.79	
Forage.....	2,820.40	
Lumber, miscellaneous.....	502.78	
Paints, oils, glass, putty, etc.....	169.34	
Rope, cord, and twine.....	218.82	
Tools and agricultural implements.....	505.72	
Stationery, printing, office supplies.....	201.17	
Harness.....	190.50	
Wagons.....	381.85	
Horses.....	750.00	
Rubber covers (storm).....	6.00	
Sun tires.....	21.01	
Installing one 1,000-gallon gasoline tank.....	258.00	
Miscellaneous work performed by this department, reimbursement being secured by repayments from other appropriations and deposits.....	1,984.36	
Total.....	38,343.52	16,364.77

**Note.**—Some bills for materials, including two horses at an estimated cost of \$250 each, have not been paid. The estimated cost is included in the material account.

#### Charges against appropriation:

Paving tree spaces.....	\$1,760.63
Proportionate part of the compensation of E. S. Dawson.....	67.50
Printing inspection and terrace forms, etc.....	39.33
Building three wagon bodies.....	206.81
Photography.....	12.32
Repairs to spraying machines.....	500.29
Fifty-three pounds of octagon steel, furnished by the water department, for sharpening tools.....	5.83
Installing water service in a small building at the nursery located at Iowa Avenue and Webster Street, NW.....	74.61
Ambulance hired to remove a sick horse, property of the District, from the street to the hospital.....	6.00
Electric current.....	61.50
Soil accounts.....	156.60
Allotment to the superintendent of repairs, District of Columbia, for materials for repairs.....	100.00

Total..... 2,991.42

By appropriation "Streets, District of Columbia, 1917, Parking Commission".....	55,000.00
By repayment to above appropriation.....	2,779.73

Total..... 57,779.73

Labor.....	38,343.52
Materials.....	16,364.77
Charges against appropriation.....	2,991.42
To balance of above appropriation, unexpended.....	80.02

57,779.73

*Expenditures from miscellaneous appropriations (exclusive of parking commission.)*

Appropriation.	Through repayment.
Billing fire department, District of Columbia, site, house, furniture, etc., Truck No. 1.....	\$11.85
Construction of Q Street Bridge across Rock Creek, District of Columbia, 1916.....	65.00
Construction of suburban roads and suburban streets, District of Columbia, 1917.....	51.65
Electrical department, District of Columbia, 1917 (lighting).....	7.29
Improvements and repairs, District of Columbia, 1917:	
Assessment and permit work.....	867.35
Grading of streets, alleys, and roads.....	173.22
Northwest telephone.....	223.33
Repairs to streets.....	23.45
Repairs to suburban roads.....	46.77
Sidewalks and curbs.....	41.26
Twelfth Street N.W., E to F Street, repave.....	16.23
Mainline Municipal Building, District of Columbia, 1917 (miscellaneous).....	2.68
Miscellaneous trust fund deposits.....	257.51
Miscellaneous trust fund deposit, District of Columbia, operating account (streets).....	326.28
Miscellaneous trust fund deposit, District of Columbia, Chesapeake & Potomac Telephone Co., general deposit.....	6.59
Miscellaneous trust fund deposit, District of Columbia, Potomac Electric Power Co., general deposit.....	6.14
Pennsylvania Avenue Bridge across Rock Creek, District of Columbia, 1916.....	318.86
Public schools, District of Columbia, 1917, repairs to buildings and grounds.....	40.63
Water department, District of Columbia, 1917, high service.....	8.58
Work performed for the United States Government as follows:	
Spraying trees on the grounds also vines and plants at the Marine Barracks, Washington, District of Columbia, settlement No. 3543.....	11.88
Spraying trees on the grounds of the navy yard, Washington, D. C., settlement No. 3588.....	46.20
Spraying trees on the grounds of the Washington Barracks and Army War College, settlement No. 28846.....	20.00
Total.....	2,779.73

*Sum expended during the year for employment of per diem employees, paid from the appropriation for "Streets, District of Columbia, 1917, Parking Commission."*

1 copyist, 305 days, at \$3.50.....	\$1,078.00
1 copyist, 255½ days, at \$3.25.....	829.57
1 copyist, 51 days at \$2.75.....	140.25
Total.....	2,047.82

*Sum expended during the year for the purchase and maintenance of horses, carts, and wagons, together with the amounts paid for single and double wagons and plow-team hire.*

[These items included in the material list.]

Horses, forage, wagons, and miscellaneous equipment and repairs.....	\$4,349.56
Single wagon hire, 35½ days at \$2.25 per day.....	793.13
Single wagon hire, 142 days at \$3 per day.....	426.00
Double wagon hire, 452 days at \$4 per day.....	1,808.00
Double wagon hire, 147½ days at \$4.50 per day.....	663.75
Double wagon hire, 512½ days at \$5 per day.....	2,713.75
Three-horse plow team, 2½ days at \$6 per day.....	13.50
Total.....	6,418.13

Total.....

It is with regret that I record herewith the death on November 11, 1916, of the late Mr. Truman Lanham, who filled the position of superintendent of trees and parkings of the District government for a period of approximately 32 years. The work he accomplished, due to his thorough knowledge of trees in general, speaks for itself and nothing that I could say here would add to the long and faithful service he rendered, and the great loss the municipality sustained in his passing away.

Very respectfully,

CLIFFORD LANHAM,  
*Superintendent of Trees and Parkings.*

ASSISTANT TO THE ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA.

## REPORT OF THE PERMIT CLERK.

WASHINGTON, August 6, 1917.

SIR: I have the honor to submit the annual report of the work of this office, giving the character and number of permits issued during the fiscal year ended June 30, 1917:

## PERMITS FOR WHICH FEES WERE PAID.

Water connections.....	1,175
Repairs.....	752
Sewer connections.....	1,295
Repairs.....	725
Gas and electric light connections.....	2,306
Repairs.....	289
Auto tire-inflating and gasoline lines.....	14
Carriage blocks and hitching posts at curb.....	1
Conduits.....	396
Gas mains.....	80
Guard stones in alleys.....	9
Manholes, connect with sewer, also enlarge.....	116
Parking fences, erect.....	209
Poles, erect, remove, and replace.....	542
Wagon tags.....	20
Total.....	7,929

## PERMITS ISSUED FOR WHICH NO FEES ARE PAID.

Special water, sewer, and gas.....	904
Blasting.....	10
Bridges across gutters.....	8
Cables, aerial and overhead connections.....	663
Driveways, lay and repair.....	73
Engines, move through streets.....	137
Parking leads, lay and repair.....	517
Parkings, pave.....	90
Parking fences, repair.....	53
Permits, renew and extend.....	98
Roadways, also alleys, close temporarily.....	23
Roadways, grade and repair.....	88
Sidewalk space, grade.....	12
Sidewalk, haul across.....	42
Sidewalk, lay and repair.....	143
Sidewalk and parking, use for business purposes.....	14
Sidewalk and roadway, occupy temporarily.....	7
Steam and electric railways.....	32
Steps on parking, construct and repair.....	278
Stop-cock boxes, regulate.....	48
Trees, remove, also trim.....	17
United States Government.....	18
Walls, build or repair retaining.....	87
Water tables, lay or repair.....	163
Wires, string overhead.....	386
Miscellaneous.....	36
Total.....	3,947

Two thousand two hundred and eighty-one communications were referred to this office. Briefs were made of these on cards, permits issued when necessary, reports made, papers indorsed and returned to the respective divisions having supervision over the inspection of the work for which the permits were issued.

Eleven thousand eight hundred and seventy-six applications were sorted, arranged according to the location of the work, and filed for ready reference. A written report was made of all permits for excavations in the public space and forwarded to the engineer of highways.

Very respectfully,

H. M. WOODWARD,  
Permit Clerk.

To the INSPECTOR OF BUILDINGS.

## REPORT OF THE SUPERINTENDENT OF THE WATER DEPARTMENT.

WASHINGTON, D. C., *September 8, 1917.*

SIR: I submit annual report of water department for fiscal year ended June 30, 1917:

The department has exerted every effort to prevent the waste of water with very unsatisfactory results. The per capita consumption, instead of being reduced, has increased from 136.5 gallons for 1916 to 139.3 for 1917, with a total mean daily consumption of 51,454,000 gallons for 1917 against 49,698,000 gallons for 1916, this, notwithstanding the installation of 6,458 meters in the residential section, 85 per cent of the entire number of services now being metered.

The increase in the per capita consumption, as stated above, is due entirely to waste of water by Federal and District Government institutions. This waste is approximately 4,000,000 gallons per day in the Government Printing Office, State, War, and Navy Building, and the Soldiers' Home. Legislative authority to alter their equipment to prevent the wasting of water is in these cases urgently needed. It is most unfortunate that the District of Columbia authorities are lacking in legal means to prevent this waste by enforcing a change of equipment. Calling the attention of the officials in charge of these institutions to the waste complained of have in few instances been fruitful in satisfactory results.

The cooperation of the United States and District Governments in an effort to eliminate all waste will, in my opinion, enable the water department, with its present supply facilities, to fully meet the needs of a population of 500,000 people, and postpone the consideration of additional supply to the year 1930.

The completion in eighteen months or two years of the central heating and power plant will save great quantities of water now used for condensing purposes in a number of the Government departments. But, on the other hand, in a number of Government buildings not supplied by this plant the waste will no doubt continue unless the necessary cooperation and legislation are obtained.

The completion of the covering of Reno Reservoir was accomplished this year, and the cover is now being used for tennis courts under the jurisdiction of the department of playgrounds of the District.

In my estimates for the fiscal year 1919 I have again asked for an appropriation for covering one basin of Brightwood Reservoir, the intention being to eventually cover both basins; when they also may be used as playgrounds.

In my last annual report I stated: "It appears absurd to spend so much money for filtering and pumping water into open reservoirs, where it becomes contaminated by dust and germs carried by the wind and rain, which necessitates the losing of large quantities of water during the year, and the expenditure of quite a sum of money for cleaning and chemically treating these reservoirs." As no money was appropriated by Congress for covering Brightwood Reservoir, it is still open and exposed to contamination.

I have again asked in my annual estimates for 1919 authority to lay a number of trunk mains requested in last year's (1918) estimates, only one of which was authorized. The need for these trunk mains is now apparent, and in one locality in the northwest section, on the gravity service, most urgent, since United States Government officials have complained in numerous instances of a lack of pressure.

A financial statement will be found in detail in the report of the division of accounts and stores. From all sources there was available for the use of the water department and Washington Aqueduct \$980,153.27 plus \$3,083.83, transfer credits received by the auditor after the close of the fiscal year.

The cash expenditures of both the supply and distribution branches amounted to \$798,798.72 and outstanding obligations of both branches \$176,705.99, leaving a net balance carried forward to 1918 accounts of \$7,732.39. The total cost of work done by the water department during the year, as distinguished from the cash expenditures, was \$660,700.65, the difference being due to increase of material purchased during the year and remaining on hand in the storerooms and property yards.

During the year 61,493 feet, or 11.6 miles, of water mains of various sizes were laid, making total length of mains now in service 3,271,156 feet, or 619.5 miles.

The mechanical equipment of the pumping station has been increased by the installation of one 5,000,000-gallon De Laval centrifugal pumping unit and two Babcock & Wilcox boilers, all now in operation.

The reports in detail of the several divisions of the department are submitted herewith.

The employees of the department have worked faithfully and efficiently, and I wish to record my appreciation of their loyal support.

J. S. GARLAND,

Superintendent Water Department.

ASSISTANT TO THE ENGINEER COMMISSIONER.

## ENGINEERING AND CONSTRUCTION.

SIR: I respectfully submit the following report of work done by Division D, engineer; and construction, for the fiscal year ended June 30, 1917:

Five hundred and forty-nine surveys were made for new mains, connections, fire hydrants, etc.; 12 investigations of pressure complaints were made; elevations were established on 177 fire hydrants and pressures taken at 238; 201 permits were requested from the sewer department to connect 1-inch drains from fire hydrants to sewer; 186 of these drains were completed and inspected; 1,421 visits to work in progress were made by the field parties, and 459 plats of complete work were made.

Weekly charts of pressure were collected from four recording gauges during the spring and summer months, and pressures taken every two months on 40 fire hydrants scattered throughout the District. New index cards were made for all new fire hydrants erected during the year.

The 20-inch third high service trunk main from Georgia Avenue and Fairmont Street to Wisconsin Avenue and Woodley Road, which was partly laid last year, has been completed and put in service. The old 20-inch and 12 inch mains which were previously used for this service are now being used as reinforcement mains for the second and first high services, connections having been made at various points with the service mains.

At First and B Streets NE., and at First and East Capitol Streets, the 20-inch and 30-inch mains over the Washington Terminal tunnel, where a bad settlement had occurred, were adjusted, partially raised to grade, and joints recalked.

Survey was begun for the 12 inch second high-trunk line from Thirty-seventh and Reservoir Street, through Reservoir and New Cut Road to Conduit Road NW.

Valves operated.....	11,827
Valves packed.....	274
Valves fitted with new key nuts.....	18
Valves examined for condition.....	94
Valves fitted with brass bushings.....	53
Valves inspected to check normal position.....	440
Valves repaired (miscellaneous).....	69
Valves capped.....	3
New brass stems installed in valves:	
36-inch.....	7
30-inch.....	1
3-inch to 8-inch.....	44
Valve casings cleaned.....	422
Valves uncovered (having been filled over).....	324
Valves examined to check number plates, grade, condition, etc.....	10,492
Broken or defective covers replaced.....	7
Valve casings numbered.....	469
Intersections at which valves were located.....	422
Hydraulic valve operators installed.....	2
Air valves installed.....	2
Air valve installed in place of old.....	1
Air valves repaired.....	2

All valve indicator posts were kept clear of grass and weeds, and painted.

Fire hydrants examined.....	55,182
Fire hydrants repaired.....	1,179
Fire hydrants fitted with air intakes.....	115
Fire hydrants flushed.....	597
Fire hydrants painted.....	4
Fire hydrants lubricated.....	2,620
Fire hydrants dry wells pumped out.....	313
Public hydrants examined.....	3,117
Public hydrants repaired.....	104
Public hydrants erected.....	15
Public hydrants erected (new in place of old).....	15
Public hydrants abandoned.....	4
Horse fountains cleaned.....	5,096
Horse fountains repaired.....	46
Horse fountains fitted with float valves.....	99
Horse fountains abandoned.....	1
Pumps examined.....	2,089
Pumps repaired.....	30

Pumps removed from shallow wells.....	5
Pumps removed from deep wells.....	2
Sanitary drinking fountains cleaned.....	30
Sanitary drinking fountains repaired.....	22
Sanitary drinking fountains erected.....	2
Sanitary drinking fountains examined.....	14
Traps to pumps, etc., cleaned.....	1,998

Brightwood Reservoir was cleaned and sprayed with copper sulphate three times, and the reservoir twice during the year.

The dividing line between services was inspected for open or leaking valves. Twenty-four cases of unpalatable water were investigated and mains flushed. Fourteen service pipes were laid, 34 repaired, 2 thawed out, and 169 adjusted. Ten drain pipes were laid, 15 cleaned, and 5 thawed out. Eighty-eight cut-offs were made for construction and repair work and 30 for water survey division. One hundred and ninety-two lead connections were made for stock. Fittings were strapped to mains at 33 locations. Forty-four bleeders were placed on the dead end of mains. Six Smith cuts were made. All plumbing was kept in repair in water department buildings.

Regular inspections were made of Reno and Brightwood Reservoirs and towers in Anacostia and at Reno.

New water mains laid, from 3 to 20 inch.....	93
New water mains laid in place of old.....	5
Mains lowered.....	7
Valves installed, from 4 to 30 inch.....	486
Valves removed and abandoned, 4 to 30 inch.....	131
Air valves installed.....	18
New valves installed in place of old (4 to 30 inch).....	28
Valve casings installed.....	492
Buffalo boxes installed.....	25
Valve casings removed.....	110
Buffalo boxes removed.....	42
New casings in place of old.....	53
Buffalo boxes in place of old.....	23
Casings adjusted.....	21
Fire hydrants erected (new in place of old, 90).....	164
Fire hydrants removed.....	109
Fire hydrants adjusted.....	15
Fire hydrants paved around.....	121
Fire hydrants sodded around.....	2
Street hydrants paved around.....	121
Horse fountains paved around.....	6
Cuts paved on account of leaks.....	11
Cuts sodded on account of leaks.....	35
Cuts paved over new mains.....	8
Cuts sodded over new mains.....	2
Miscellaneous cuts paved.....	34
Connections to private premises (2 to 6 inch).....	56
Connections between mains (6 to 12 inch).....	10
Miscellaneous jobs, adjustment, repairs, etc.....	33

Three thousand seven hundred and eighty-nine tons of pipe, 135 tons of fittings, 48 tons of fire hydrants, 50 tons of pig lead, 26 lengths of 24-inch and 6,873 lengths of 15-inch terra-cotta pipe, 22 cubic yards of broken stone, 116 cubic yards of gravel, 125 yards of sand, 270 pounds of cement, 25,200 bricks, 500 asphalt block, 314 wagons loads of freight, 568 sets of horseshoes, and 139 sets of horseshoe pads were hauled.

Wagons and trucks repaired.....	103
Auto trucks repaired.....	13
Wagons and trucks painted.....	29
Auto trucks painted.....	3

The following is a report of work done by the telephone division during the year ending June 30, 1917:

Recorded:	
Leaks.....	2,250
Fire hydrants out of service.....	470
Fire hydrants in service.....	481
Service pipes cut off by the water registrar's office.....	8,197

## Recorded—Continued.

Service pipes cut off by the water survey division.....	41
Fire alarms.....	637
Reservoir elevations.....	2,190
Gatehouse elevations, filtration plant.....	306
Engine counters, Anacostia.....	1,460
Engine counters, Reno.....	1,460
Leak man's reports.....	7,449
New jobs.....	364
No-water complaints.....	31
Low-pressure complaints.....	4
Turn on of services.....	364
Issued work orders for the repair of fire hydrants, etc.....	1,582
Issued daily morning reports of the various job locations.....	3,050
Telephone connections.....	186,605

All reports of leaks and the movements of the leak gangs are recorded and kept by the telephone operators at the department switchboard.

The daily morning reports of the various job locations, construction and repair gangs is compiled and typewritten by the telephone operators.

The daily meter readings at Brightwood Reservoir are received and transmitted to the office by the telephone operators.

In a great many cases the construction and repair jobs are received and transmitted to the foreman and repair men by the telephone operators.

The weekly reports for the repair of leaks are compiled and typewritten by the chief telephone operator.

The movements of the repair men, foremen, and inspectors are recorded by the telephone operators.

All reports of broken valve covers, dangerous holes, etc., are handled by the telephone operators through the storeroom and stables. On Sundays and holidays this work is assigned to the leak men for disposition.

New fire hydrants erected and new fire hydrants erected in place of old are reported by the telephone operators and all information pertaining to same is transmitted to the chief engineer's office, District of Columbia fire department.

In addition to the clerical and telephone duties he acts in the capacity of librarian.

The telephone switchboard is connected by means of 4 lines with the Chesapeake & Potomac Telephone Co., by 1 line with fire-alarm headquarters, 3 lines with Main 6000, and 32 lines with the various divisions and branches of the water department.

*Statement of water-main account for the year ended June 30, 1917, showing various sizes and number of feet laid of each size.*

	Linear feet.
20-inch.....	13,007
12-inch.....	5,640
Total trunk mains.....	18,647
3-inch.....	1,709
4-inch.....	2,765
6-inch.....	2,489
8-inch.....	35,883
	<hr/>
	42,846
Total laid.....	61,493, or 11.65 miles.

Total length of mains in service at the present time is 3,275,875 feet, or 620.43 miles.

During the year 6,105 feet of main of various sizes were abandoned. The above report does not include 28 feet of 8-inch main, 3,921 feet of 6-inch main, 770 feet of 4-inch main, one 8-inch two-way valve, one 6-inch four-stem valve, two 6-inch four-way valves, one 6-inch three-stem valve, six 6-inch two-way valves, three 4-inch two-stem valves, and four fire hydrants in the territory lying between Second and Fourth Streets, M and the Potomac River SE., acquired by the Navy Department by act of Congress, approved August 29, 1916, making appropriations for naval service for fiscal year ending June 30, 1917.

FREDERICK W. ALBERT,  
Engineer.

The SUPERINTENDENT OF THE WATER DEPARTMENT.

## PLANS, ESTIMATES, AND TESTS.

SIR: I have the honor to submit the following report of work done by division E, plans, estimates, and tests for the fiscal year ended June 30, 1917:

The subdivision of tests and experiments is charged with testing and correcting the measuring apparatus used by the department; with making accuracy tests of all water meters used in the District of Columbia; with purifying the oil removed by the waste-cleaning machine; with making special tests of boilers and machinery as called for; with figuring the daily pumpage, consumption, station duty, etc.; and with keeping necessary records.

Special tests made during the year include duty trials of pumping engines and electric generating sets; measurements of the amount of water supplied to boilers and apparently evaporated and the quantities of steam actually used for power purposes, with a view of locating an unaccounted-for steam loss as figured from the known efficiencies of the steam-using devices; tests of the electric units to determine the cost of current generated at the pumping station; tests to determine the relative value of heating feed water by means of live steam and by means of a circulating pump on the economizer; evaporative and capacity tests on the new Babcock & Wilcox boilers, Nos. 7 and 8; and official duty trials on the 5,000,000-gallon De Laval turbine centrifugal pumping unit installed at the District pumping station.

Miscellaneous tests made include the following: Water meters  $\frac{1}{2}$  to 6 inch sizes, tests for accuracy, 16,234; valves,  $\frac{1}{2}$  to 30 inch sizes, tests for leaks, 854; corporation cocks,  $\frac{1}{2}$  to 1 $\frac{1}{2}$  inch sizes, tests for leaks, 1,063; curb cocks,  $\frac{1}{2}$  to 1 inch sizes, tests for leaks, 5,138;  $\frac{1}{2}$ -inch compression hose bibs, tests for leaks, 6; 1-inch goosenecks, tests for leaks, 193; fire hydrants examined and tested, 93; and pressure gauges tested and corrected, 63. Also durability tests of small-sized water meters, accuracy tests of small-sized water meters, accuracy tests of recording flow meters and recording pressure gauges, tests of automatic measuring tanks, set up recording pressure gauges on fire hydrants, tested and adjusted pressure regulator valves, repaired clock movements, and overhauled Venturi meter recorders,  $\text{CO}_2$  recorders, and other testing and measuring apparatus installed in the pumping station.

All of the 9,690 five-eighth-inch Worthington water meters furnished under contract during the year have met the contract guarantees. The 7,000 meters furnished under this year's contract included 6,705 accepted "as received," 246 rejected on account of "inaccuracy," and 49 rejected on account of defective screw holes in register cases.

During the year there were 1,456 gallons of oil removed from the material passed by the waste-cleaning machine and rendered fit for use in oil cups. This is 623 gallons more than was recovered during the preceding year.

All of the coal burned at the pumping station during the year was bituminous coal, and was purchased on the "ash, moisture, heat unit" basis. Samples were collected from each of the first 300-ton deliveries of coal, and forwarded to the Bureau of Mines, where all tests were made. The analysis averaged 2.2 per cent moisture "as received" and 17.3 per cent volatile matter, 72.41 per cent fixed carbon, 1.64 per cent sulphur, 10.3 per cent ash, and 13.983 British thermal units per pound, on the "dry coal" basis. Owing to a delay in the completion of the Bureau of Mines new laboratories, we were unable to secure analysis of the samples of coal taken after March 17.

The total pumpage for the year was 8,706,610,000 gallons, which is 84,670,000 gallons more than in 1915-16. The total operating expenses chargeable to pumping was \$46,613.90, as against \$49,617.60 in 1915-16, making the total operative cost of pumping 1,000,000 gallons of water into the mains, \$5.35. This is approximately 6.6 per cent less than in 1915-16, and is mainly due to differences in the items of repairs. The cost of repairs for the year was \$7,647.60, against \$12,187.35 in 1915-16, when the new pump chambers installed on No. 4 pumping engine, costing, exclusive of labor, \$3,072.61, was included in the item of repairs. The cost of coal for the year was \$3.52, which was 25 cents more than for 1915-16.

The station duty for the year was 66,836,218 foot-pounds per 100 pounds of coal. This is 1.1 per cent less than the duty obtained during the preceding year and represents an annual loss of 59.9 gross tons of coal. This loss may be attributed to a less proportionate amount of work performed by the high-duty pumping units.

Reports on all the special tests and monthly statements showing the pumpage, consumption, mean water pressure, force of draft entering and leaving economizers and at base of stack, steam at boilers, mean temperatures of outer air, boiler room, water in mains, water entering economizers and boilers and gases entering and leaving economizers and boilers and gases entering and leaving economizers, vacuum pressures, foot-pounds of work by engines and generators, coal burned, station duty, per cent of  $\text{CO}_2$  in flue gases, etc., have been submitted. A report was

also submitted showing the operative cost of pumping to the several high services, individually during the fiscal year 1916.

The accompanying tabular statements show the sizes and makes of all private and municipal water meters tested during the year, and the operative cost of pumping.

*Cost of operating pumping engine at the District pumping station during the year ending June 30, 1917.*

Operating expenses:

Salaries—1 chief steam engineer, at \$1,750 per annum; 2 steam engineers, at \$1,100; 3 assistant steam engineers, at \$1,000; 3 firemen, at \$875; and 4 oilers, at \$610 (less deduction on account of leave).....	\$10,815.01
Miscellaneous per diem labor—substitute engineers, substitute firemen, boiler cleaners, steam fitter, electrician, helpers and laborers.....	6,071.46
Coal, 12,574,799 pounds bituminous coal, at \$3.52 per ton (corrected for deductions on account of British thermal units and excess ash).....	19,701.90
Supplies, oils, greases, etc.....	2,377.93
Repairs to pumps, engines, boilers, and electric generators—	
Per diem labor.....	\$5,739.03
Material expended.....	1,908.57
	7,647.60

Total cost of operation.....	46,613.90
Total pumpage for the year, without allowance for slip.....	gallons.. 8,706,640,000
Greatest amount pumped in 1 day (Feb. 5).....	do... 27,324,300
Least amount pumped in 1 day (Sept. 3).....	do... 19,218,400
Average per day.....	do... 23,853,807
Average dynamic head against pumps, in feet.....	115.83
Gallons pumped $\times$ 8.34 $\times$ 100 dynamic head.....	66,886,218
Duty= Total fuel consumed	
Cost of fuel, pumping 1,000,000 gallons 1 foot high.....	cents.. 1.95
Total operative cost of pumping 1,000,000 gallons 1 foot high.....	do... 4.62
Total operative cost per 1,000 gallons pumped.....	do... 53.5 1.00

NOTES.—The above items of salaries, supplies, and repairs were furnished by the clerical division. The pumpage is figured from plunger displacement without allowance for slip. The aggregate slip of all reciprocating pumps during the year, based on pitometer determinations, was 7.49 per cent. Venturi meter measurement was made of pumpage by the centrifugal pumping unit. The average dynamic head is figured from the total work done by pumping engines and generators. The fuel consumed is the total coal burned, excluding the heating system. The cost of heating (402,700 pounds of coal) was \$632.81.

*Tests of private and municipal water meters (excluding meters on endurance test) during the fiscal year ending June 30, 1917.*

Meter.	Size in inches.										Total
	8	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	3	4	6		
American.....	44	1	5								50
Crown.....		3	3		2	7	9		2		26
Empire.....	1	15	11		2						29
Enarc.....		3	15	1	9	11					39
Gamon.....	15										15
Gem.....											3
Hersey.....	1,645	156	16		23	12	20	2	1	1,875	
Keystone.....	438	6	10			1	3				458
King.....	7		9	1	3	2					22
Lambert.....	162	58	43		30	17	7				257
Nash.....	14	152	199			50	20	11			446
Niagara.....	1	25	31	11	28	35	3				134
Pittsburgh disk.....		4	2		1	2					9
Thomson.....		3	4		9	6					22
Trident.....	119	30	17		5	1	8	5			185
Union.....				27							28
Worthington.....	12,593	21	15	5	12	7	17	4		12,674	
Total.....	11,970	477	407	18	124	153	87	24	3	16,272	

The subdivision of "Miscellaneous drafting" is charged with the work of preparing plans and estimates, reports, records and correspondence, and giving out miscellaneous information. The detail of the work performed follows:

Drawings and tracings made.....	408
Projects made.....	104
Files forwarded to the assessor.....	86
Cards forwarded to the assessor.....	184
Postings of engineers' notes on 50, 100, and 300 foot scale maps and map tracings. 1, 103	
Valve notes posted.....	542
Communications, reports, etc., written.....	2, 893
Locations for cut-offs given out.....	70
Permits passed.....	530

The routine work of the division consisted of posting daily the 50, 100, and 300 foot scale maps and map tracings of the District; making projects for water-main extensions; posting daily the work-in-progress maps and the graphical log; working up daily the data showing pumping operations and water consumptions; making up cards showing mains, valves, etc., at street intersections; posting valve notes on intersection cards; passing schedules of work to be done under commissioners' orders; passing permits for terraces, copings, and driveways; miscellaneous lettering; estimates and reports on water-main extensions and new connections; and general office work.

This routine work will be changed somewhat this year. The data showing pumping operations and water consumption will be worked up and checked entirely by division of tests and experiments. The intersection and alley square cards are now posted from the engineer notes, which contain the additional information formerly furnished by the valve division notes, which have been discontinued.

The titles of some of the mechanical drawings made are as follows: Complete revision of plans for the installation of a hydraulic-valve operator on two 48-inch valves at Fourth and College Streets NW.; 6 standard meter assemblies for the installation of 3, 4, and 6 inch meters;  $\frac{3}{4}$ -inch curb cock;  $1\frac{1}{2}$ -inch combination tap and drill for Shelly tapping machine; new plans materially reducing weight of large and small valve casings and cover; new sanitary drinking fountain; revision of auto-driven valve operator for large valves; centrifugal pump installations for operating large fountains; reinforced concrete valve casing and iron forms for same.

The following drawings of an architectural nature were made: Shelter and entrance tower on new Reno Reservoir cover, four tennis courts on Reno Reservoir cover, concrete steps around gatehouse of Reno Reservoir, preliminary plans and computation for reinforced concrete cover over Brightwood Reservoir, concrete walk and drains around Reno Reservoir.

Of maps and plans made the following are worthy of mention: Fifteen new 50 and 100 foot scale water-main maps were made, together with two tracings of each. In addition to this, 20 new tracings of 50 and 100 foot scale maps were made to replace those found in a dilapidated condition; new index map for the counter of room 310. Map of Washington and vicinity was colored to show the different water-service areas, and the acreage and population of each service area were computed, in a strip of Maryland 3 miles parallel to the District line; in the District portion of the map the present and proposed trunk mains to serve this portion of Maryland were shown. A somewhat similar map was prepared for the Maryland sanitary commission; map of Georgia Avenue for the Bureau of Standards electrolysis test; map showing property to be acquired by navy yard and changes in mains required; reference map showing water mains and sewers in the District of Columbia; map of Reservation No. 13, showing changes in mains required to supply water to new Gallinger Hospital; map showing changes required in water mains by proposed new railway construction in Eighteenth and Nineteenth Streets south of Pennsylvania Avenue NW.

The following diagrams and charts were made: Diagram showing water consumption, services, meters in use, etc., 1896 to 1916; diagram showing estimated and actual receipts and expenditures of the water department for the fiscal year 1916-17; new chart showing gallons of water in Reno Reservoir for every tenth of a foot change in elevation. This was made on account of the new construction; 19 organization charts were made. The following were posted during the year: Diagram showing estimated and actual receipts and expenditures of the water department, diagram showing average daily consumption of water for the month of March, diagram showing the average daily consumption of water for the month of November, diagram showing the mean of the average daily consumption of water for the months of March and November; diagram showing water rent and mean total consumption of water per day, 1915-16, organization chart of the District of Columbia, organization chart of the water department.

The titles of some of the miscellaneous drawings made are: Reinforced concrete ice chest for cooling drinking water, wood and galvanized iron ice chest for cooling drinking water, reinforced concrete park bench for Reno Reservoir.

Other items of the work performed by this division are as follows: Made up list of all trunk, service, and alley water mains supplying each service area of the District; made up list giving amount of water main required and the cost of replacing all 4 and 6 inch mains in the District of Columbia, with 8-inch mains in the residence section and with 12-inch mains in the business section; the card index of intersection cards was completed; a list was compiled and slides made for a descriptive lecture on the entire waterworks system of the District of Columbia; a list was compiled of the available photographs and negatives illustrating the different stages of construction work on the principal structures of the water department for use of the United States Army War College; estimates were prepared on the cost of construction of the proposed new water tower for Reno; the water registrar's books of 50 and 100 foot scale map tracings were posted three times during the year; forty sets of 300-foot scale blue prints were prepared for distribution to the field parties.

The reinforced concrete cover for Reno Reservoir, which was constructed under the supervision of this division, was completed August 19.

On July 25 a deflection test was made on two adjacent panels, one wall and one interior, between the first and second rows of columns from the south end of the west side. The slab at these two panels was poured April 28, May 1, and May 2. The interior panel was apparently one of the weakest in the whole structure, having two construction joints intersecting in the center of the span. The cover was designed for a live load of 75 pounds per square foot, but was tested for a load of 150 pounds per square foot.

The material composing the load consisted of metal form plates 20 inches square, gravel and sand. The form plates were placed directly upon the slab six high. The weight imparted by the plates was 35 pounds per square foot. Levels were taken after loading. As no more form plates were available, the remainder of the 150 pounds per square foot was made up of gravel and bags of sand. Two metal points were set in cement in the center of each panel, upon which elevations were taken with an engineer's level. Two days after the load was removed levels were again taken, and it was found that the panels had returned to within one thirty-second of an inch of the original elevation. The following table gives the loadings and deflections in, inches:

Time of taking levels.	Load.	Deflection.	
		Interior panel.	Wall panel.
Immediately after load was applied.....	Lbs. per sq. in.	Inch.	Inch.
	35	1/2	1/2
	98	1/4	1/4
	150	1/2	1/2
24 hours after applying load.....	150	1/2	1/2
48 hours after removing load.....	150	1/4	1/4

As the allowable safe deflection for flat slab floors of 16.5 feet span is one-fourth inch, we can consider this floor to be absolutely safe.

Other work to which men of this division were detailed is as follows:

Laying out of tennis courts on Reno Reservation cover, 12 boiler and engine tests at the District pumping station, war registration of absentees and war registration, duplicating war registration cards; a total of 65 days.

D. W. HOLTON,  
Assistant Engineer.

The SUPERINTENDENT, WATER DEPARTMENT.

#### STEAM ENGINEERING AND SHOPS.

SIR: The following is a summary report of work done at the District pumping station during the fiscal year beginning July 1, 1916, and ending June 30, 1917:

Water pumped, figured from plunger displacement:

First high service .....	5,497,286.850
Second high service .....	2,551,801.340
Third high service .....	652,880,909
Total .....	8,701,969,099

Coal burned .....	tons..	5,790,269
Cylinder oil used.....	gallons..	825,625
Engine oil used .....	do....	844.5
Turbine oil used .....	do....	47,8125
Grease used .....	pounds..	381.5
Waste .....	do....	788,375

The regular force employed for the operation of the pumping engines, boilers and auxiliaries, cleaning of machinery, etc., is as follows:

	Steam engineers.	Assistant steam engineers.	Firemen.	Oilers.	Cleaners.	Laborers.
Sunday.....	3	3	3	4	4	4
Week days.....	3	3	3	4	4	4

For the fourth high service the water is pumped from the Reno Reservoir (which is supplied by the third high service pumps) to an elevated tank, by gasoline engines and triplex pumps. This machinery is operated daily by the watchmen in charge of the reservoir, and one assistant on night duty. The water pumped for this service during the year was 76,925,382 gallons, or a mean of 210,754.5 gallons daily.

The Anacostia pumping station has been operated without interruption during the year, pumping to the three towers supplying the area east of the Anacostia River. This station is taken care of by three men.

The water pumped during the year, figured from plunger displacement, follows:

First high service.....	125,648,100
Second high service.....	12,295,244
<hr/>	

Total..... 137,943,344

or a mean of 377,927 gallons daily.

#### REPAIR SHOPS.

The work accomplished during the year follows: All necessary repairs for the machinery at the District pumping station, fourth high service and Anacostia stations; repairs to automobile trucks, both for this department and the several departments of the District of Columbia; made practically all repair parts for fire plugs, valves, street hydrants, etc., including all tools used on the work of laying water mains, etc., such as picks, chisels, breakers, calking tools, yarning irons, valve keys, pipe bands, eyebolts, arch irons, and miscellaneous tools and appliances as required for the various work.

\* \* \* \* \*

The detail of the work follows in part: Put covering on No. 4 horsepower cylinder, and changed liners on shaft bearing No. 4 engine; put on new sprockets, chain and worm gear on economizer; put 8-inch valve in exhaust line on 150-kilowatt Westinghouse engine; machined eight bases for lamp-posts on bridge at Twenty-sixth Street and Pennsylvania Avenue; repaired bearings for cranks on 150 and 50 kilowatt engines; repaired dirt rammer; put one tube in No. 5 boiler; rolled tubes in No. 5 boiler; packed valves on Holly return system; made connections for weir box to calibrate instruments for water survey division; fitted piston rings and made adjustments on engines at Anacostia; made new operating screw for 30-inch valve at New Jersey Avenue and L Street; made connections for manograph recorder in engine room; erected valve operator at Twenty-ninth and M Streets NW.; built three lawn rollers for new Central High School; made air chamber for No. 4 engine feed pump; made latch plates for No. 4 engine; repaired water columns on boilers Nos. 3 and 4; made new pulley block for flag pole at Anacostia; made aluminum signs for electrical department; repaired 1-ton Badger jack; machined lamp-posts for electrical department; cleaned out tubes in auxiliary heater in basement; made connections for new boilers Nos. 7 and 8; bored out valve chamber and put in new pin, brasses, and connecting rod on 150 kilowatt engine; changed pipe on heating system; made connections for Lea recorder; made new bonnet for relief valve on Westinghouse engine; put new joint in steam pipe to No. 4 engine; set and made connections for new triplex pump in basement; took Kerr turbine apart for general overhauling and placed same in position after repairs were made; erected fence for tennis courts on Reno Reservoir; dis-

mantled old coal scales and erected new weighing hopper, and altered track and coal scales in boiler room; made connections for test on Nos. 7 and 8 boilers; made new operating shaft for 48-inch valve at Fourth and College Streets; made shaft and parts for drive on 48-inch pipe cutter; machined standpipes for drinking fountains; repaired duplex pump for asphalt plant.

Two of the most important features of the year were the installation of the 5,000,000-gallon De Laval turbocentrifugal pump for the third high service and the installation of two new Babcock & Wilcox boilers. Both the pump and boilers are now in daily use.

Built forty-four 3 and 4 way valves, with 6 and 8 inch bells; one hundred 4-inch, one hundred and thirteen 6-inch, one hundred and twenty-one 8-inch, and twenty 12-inch gate valves; repaired 2-way valves as follows—nine 3-inch, thirty-one 4-inch, fifty-three 6-inch, eleven 8-inch, two 12-inch, five 4-way, and seven 3-way; total, 118 valves; repaired 32 Buckeye furnaces; reversed bells on 61 fire hydrants; cut pipe and nipples for storekeeper; repaired 2,862 water meters; assembled street hydrants; unloaded tank cars of fuel oil for Anacostia station. This work consists of pumping the oil from the car at the Twining City siding to the storage tank at the station. Sharpened horse clipping knives and completed numerous small jobs for the department.

#### BRASS FOUNDRY.

During the year all composition metal castings for valve work, repair parts, etc., have been made in our foundry, which has been operated without interruption. There were made in the foundry 11,103 pounds of brass castings, small and medium size, such as would be made in a general jobbing shop, also aluminum street signs for the electrical department. The foundry is also working on a contract for triangulation, bench, and reference mark castings for the Coast and Geodetic Survey. The showing of the foundry for the year is very satisfactory, and the repair work at this station has been much expedited by the casting of repair parts when needed for emergency. Attention is invited to the annual report of the foundry.

#### BLACKSMITHING.

The blacksmiths have made 5 curb and extension keys, 8 casing hooks, 200 calking sets, 35 pipe hangers, 20 stakes, 3 stone drills, 18 machine drills, etc.; repaired 206 stakes; sharpened 6,714 chisels and 15,830 picks; welded 666 new ends on picks; repaired 182 curb and extension keys; repaired 39 casing hooks, 33 valve keys, and 176 steel bars and 45 frost pins; made 2 tunneling bars and repaired 28 tunneling bars; sharpened 170 drills; made irons for concrete forms, 100 new diamond chisels, 75 new lifting chisels, angle irons for fence on Reno Reservoir, damper levers for boilers, S wrenches, hook bolts, pipe bands, stone drills, and made necessary repairs to wagons and auto trucks.

#### CARPENTRY.

The carpenters have made doors for west entrance to storeroom; built workshop at Anacostia; made cardcases for office; made screens for office in automobile repair shop; extended counter in water registrar's office and store room; repaired sash in automobile repair shop; and put up 2 iron window guards; made pattern for 24 and 30 inch valve stem and copper hammer; made case for storing record cards for storeroom; made desk for stable office; made tool boxes for automobile repair shop; repaired roof on stable; made pattern for rod meter stuffing box, gear box on automobile, and cover plate for Reno; made weir box for pitometer test; built roof for entrance to Reno Reservoir; built vault at Twenty-sixth and Pennsylvania Avenue; made case for manograph; made metal screens for Reno tower; made galvanized tank for water registrar; grouted engine and pump beds for centrifugal pump; made screens for entrance to Reno Reservoir; cut out and plastered concrete at gatehouse, Reno Reservoir; built water tanks for water registrar; made storm sash for Reno; built vault for meter on Tunlaw Road; made water tank for returns from heating system; made waste-paper baler; made map holder for office; built bins for storeroom; made patterns for street signs; made patterns for valve bonnet on Westinghouse engine; made box for Lea recorder, and tank for same; made pattern for drinking fountain; made cover for hot-water tank; made posts for tennis court nets and tank for testing thermometers; built automobile pit in repair shop; made pattern for manometer case; repaired stall floors in stable; built concrete benches for Reno; made flask for foundry; built vault at Thirtieth and K Streets NW.; cut openings in wall at Central High School; built vault at Thirty-sixth and M Streets; built meter vault at New York and Florida Avenues; put concrete floor in gatehouse at Brightwood; built fence back of green-

house; built vault on D Street between Seventeenth and Eighteenth Streets; repaired bridge at Woodridge; made 1,264 concrete rings, 372 sectional rings; filled 470 casing covers and 226 meter box covers; and made 303 concrete cylinders.

#### PAINTING.

The painters have painted wagons and automobiles, card cases for water registrar, gauge boxes; put canvas covering on breeching in basement; painted fence at Brightwood Reservoir, tool house at Anacostia station; coated base for centrifugal pump; painted platform and rail on Q Street Bridge, walls in boiler room, wagon and oil pump for Anacostia, trolley rails and hoists in boiler room basement, ceiling in hallway, entrance to Reno Reservoir, section of fence and ironwork in gatehouse at Reno, timber work on Anacostia Lodge; electric conduits in basement; covered steam pipes and fittings to centrifugal pump; cleaned and painted concrete top on Reno Reservoir; painted new street hydrants; cleaned and painted intake tower at Brightwood Reservoir; cleaned and painted tower and pipe in north basin of Brightwood Reservoir, tank at Thirtieth and R Streets SE.; lettered automobiles and wagons; cleaned and painted tank at Tenth Street and Alabama Avenue and tank at Staunton School, painted pipes on Benning Bridge, boats for Brightwood Reservoir, ironwork for tennis courts at Reno; woodwork and ceiling in storeroom, walls in automobile repair shop, ironwork on Nos. 7 and 8 boilers; covered pipes on Nos. 7 and 8 boilers and painted same; painted supporting beams and pipe under bridge on Minnesota Avenue cleaned and painted bridge at Woodridge; made and repaired curtains and cushions for wagons, automobiles, and buggies, and did other miscellaneous work.

#### ELECTRICAL WORK.

The electrician and helpers have taken care of generators, switchboards, motors, lights, etc.; operated conveyor, economizer scrapers, and crane; tested and recharged storage batteries; repaired electric fans and lighting systems on various automobiles; extended lines in automobile repairshop for auxiliary bell and telephone; made repairs to 50 and 150 kilowatt engines; run wires for lights at Reno; changed lighting system throughout the pumping station and offices; connected starting rheostat for motor-driven pump for centrifugal pump; installed level indicator at Reno; assembled and tested 125-kilowatt generator; made repairs to Deane vacuum pump; repaired scale in boiler room; fitted up switchboard for triplex-return pump; repaired and made adjustments to blue-printing machine; put up starting rheostat on Nos. 7 and 8 boilers.

#### CARE OF STATION.

The janitor and his force have taken care of all cleaning throughout the building; removing shavings from the woodworking shop; attended to window cleaning; removing turnings, scrap, and other material from machine shop; furnished messenger service to the office, etc.

JAS. T. FINK, *Master Mechanic.*

The SUPERINTENDENT, WATER DEPARTMENT.

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#### WATER SURVEYS.

SIR: Water surveys by this division during the fiscal year ended June 30, 1917, resulted in the detection of 1,752,800 gallons per day underground leakage from the service pipes, mains, connections, etc.

The work during the year was confined principally to the territory supplied by the gravity service. The leaks were due to the usual sources, leaking services being responsible for the greatest portion of the waste, as in previous years. In spite of the vast quantity of waste found on the iron service pipes and repaired in past years these old wrought-iron pipes continue to lead in the waste figures with 759,600 gallons daily leakage found during the year to their credit. A grand total of 340 individual leaks was found as shown on statement of "Year's results" herewith. The average waste per leak was 5,155 gallons daily as compared to the figures last year of 4,720 gallons daily.

A total of 151.5 miles of mains was tested and 273,500 gallons daily underground leakage was found chargeable directly to the street mains, or 1,800 gallons per day per mile of pipe. This figure includes leakage from lead-caulked joints, broken mains, valves, blow-offs and all other sources which strictly pertain to the street mains, and does not include service-pipe leakage. Information of general value is thrown upon

the question of allowable leakage by this figure and the determination of the corresponding figures for previous years will be made and inserted in the next annual report of this division.

Complete data have not been compiled as yet showing the total length of lead joints involved in the figures, but practically all mains surveyed this year were 6 inches in diameter with joints at 12-foot intervals.

Fixture inspection in unmetered houses was made during the year in 9,977 premises, leaks being found in 904, or 9 per cent. This percentage in comparison with figures of previous years is very favorable considering the fact that practically all of the inspection work was confined to the gravity service where the poorest class of plumbing prevails.

The largest individual leak of the year was on a 2-inch iron service pipe wasting water underground at the rate of 130,000 gallons daily. Other interesting cases were a disconnected service flowing 60,000 gallons daily, a broken main flowing 65,000 gallons daily, and a lead-calked joint wasting 20,000 gallons daily.

Special work of the year embraced investigations at Federal and municipal institutions, consultation with Government officials relative to water usage in Federal plants, construction and installation of manograph apparatus for the field work and for measuring pump discharges at Bryant Street pumping station and collection of data for metering Federal buildings.

Investigations were made at the State, War, and Navy Building, Government Printing Office, Soldiers' Home, Bureau of Standards, Blue Plains, Bureau of Mines, Agriculture Department, navy yard, and other institutions to determine water consumption, waste due to use of filtered water for condensing purposes, and other information bearing upon the consumption of city water. Corrective measures should be adopted at most of these institutions to permit the stoppage of waste. The worst offenders in the matter of waste are the Government Printing Office, State, War, and Navy Building, and Soldiers' Home. The total preventable waste in these institutions is approximately 4,000,000 gallons daily. Repeated attempts to secure the adoption of water-saving devices in these institutions have failed and it seems that the only possible relief lies in congressional action, which should be sought.

Full information upon the routine work of this division is given in the tabulated statements which supplement this report.

Very respectfully submitted.

PAUL LANHAM,  
*In Charge Water Survey.*

SUPERINTENDENT, WATER DEPARTMENT.

#### SUPPLEMENTS, 1916-17.

Statement No. 1.—Underground leaks, 1907-1917.

Statement No. 2.—Year's results, 1916-17.

Statement No. 3.—Sources and quantities of underground leakage, 1907-1917.

Statement No. 4.—Results, house inspection, unmetered, 1907-1917.

Statement No. 5.—Surveys of permanent districts:

- A. District A, gravity.
- B. District C, gravity.
- C. District D, gravity.
- D. District E, gravity (miscellaneous).
- E. District F, gravity.
- F. District II, first high (miscellaneous).

#### STATEMENT No. 1.—*Underground leaks, 1907-1917.*

Year.	Number.	Quantity per day.	Average per day.
		Gallons.	Gallons.
1907-08.....	271	5,604,400	20,700
1908-09.....	832	9,560,600	11,500
1909-10.....	532	6,364,200	12,000
1910-11.....	624	6,921,900	11,100
1911-12.....	813	5,115,300	6,390
1912-13.....	651	4,195,100	5,400
1913-14.....	452	2,552,800	5,600
1914-15.....	385	1,828,820	4,800
1915-16.....	420	1,981,600	4,700
1916-17.....	340	1,752,750	5,155
Total (10 years).....	5,320	45,877,470	8,624

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

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## STATEMENT No. 2.—Year's results, 1916-17.

## Service pipes inspected:

Metered.....		23, 759
Unmetered.....		20, 779
Houses inspected, unmetered.....		9, 977
Houses with defective fixtures.....		904
Number of notices served.....		249
Number of services cut off.....		41

*Underground leakage.*

Class.	Number.	Gallons per day.	Class.	Number.	Gallons per day.
Abandoned services, taps, etc..	6	124,400	Stopcocks.....	15	26,800
Iron services.....	138	750,600	Joints on mains.....	34	131,500
Lead services.....	25	143,900	Broken mains.....	2	115,000
Wiped joints.....	37	128,800	Valves.....	5	13,000
Drain on fire service.....	1	107,900	Blow-offs.....	2	15,000
Services, metered.....	43	60,880	Total.....	340	1,752,750
Couplings.....	32	126,880			

## PHOTOGRAPHIC WORK.

Blue prints made for division E.....	1, 270
Blue prints made for division B.....	40
Photographic plates exposed, developed, etc.....	10
Photographic prints exposed, developed, etc.....	27

## EXPENSES.

Operating, per diem labor and material.....	\$23, 685. 01
New work, per diem and material.....	2, 172. 20

## STATEMENT No. 3.—Sources and quantities of underground leakage, 1907-1917.

Class.	1907-8	1908-9	1909-10	1910-11	1911-12	1912-13	1913-14
SERVICES.	<i>Galls. daily.</i>						
Abandoned taps and services.....			355,300	173,600	174,200	180,900	101,700
Iron services.....			{ 2,438,000	1,582,900	2,329,800	1,988,800	924,000
Lead services.....	2,729,000		1,201,900	1,237,600	977,700	394,000	471,000
Wiped joints.....	327,000		710,100	665,700	438,100	282,300	237,000
Couplings.....		5,214,000	118,700	182,900	123,700	75,000	66,900
Stopcocks.....			84,800	43,300	53,500	32,900	16,900
Street washers.....				42,000	10,400	5,700	500
Public hydrants.....				84,200	50,290	21,000	12,000
Unclassified.....	111,000	2,039,500		97,600	103,800	15,000	56,500
Total.....	3,167,000	7,253,500	4,908,800	4,036,800	4,260,400	2,996,200	1,886,500
MAINS.							
Joints on mains.....	1,039,900	1,345,600	1,034,200	2,562,500	746,300	962,300	596,800
Broken mains.....	1,200,000	117,000	332,000	15,900	7,000	103,300	62,200
Valves.....	23,500	62,000	89,100	110,900	27,100	13,200	6,800
Blow-offs.....		737,000		176,600	71,300	6,000	
Fire hydrants.....	174,000	45,500		19,200	3,500	115,000	500
Total.....	2,437,400	2,307,100	1,455,300	2,885,100	855,200	1,199,800	666,300
Grand total.....	5,004,400	9,560,600	6,364,100	6,921,900	5,115,600	4,190,000	2,552,800

## 78 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

STATEMENT No. 3A.—*Sources and quantities of underground leakage, 1907-1917.*

Class.	1914-15	1915-16	1916-17
<b>SERVICES.</b>			
Abandoned taps and services.....	54,700	68,700	124,400
Iron services.....	861,950	449,440	759,000
Lead services.....	254,100	201,380	143,900
Wiped joints.....	213,500	342,480	128,800
Couplings.....	20,500	115,450	126,880
Stopcocks.....	17,150	28,700	26,800
Public hydrants.....	500		
Unclassified.....	32,200		108,780
Total gallons.....	1,454,600	1,206,150	1,479,250
<b>MAINS.</b>			
Joints on mains.....	308,800	607,350	130,500
Broken mains.....		142,800	115,000
Valves.....	300	3,300	13,000
Blow-offs.....		8,000	15,000
Fire hydrants.....	5,120	13,400	
Total gallons.....	374,220	775,450	273,500
Total miles.....			151.5
Average per mile.....	gallons		1,800
Grand total.....	1,828,820	1,981,000	1,752,750

STATEMENT No. 4.—*Results, house inspection, 1907-1917, unmetered.*

Year.	Houses inspected.	Houses with defective fixtures.	Percentage.	Year.	Houses inspected.	Houses with defective fixtures.	Percentage.
1907 <sup>1</sup> .....				1912-13.....	26,397	3,725	14.1
1908-9.....	27,758	4,621	16.6	1913-14.....	17,039	1,603	9.4
1909-10.....	21,642	3,305	15.2	1914-15.....	17,503	1,691	9.6
1910-11.....	21,547	3,262	15.1	1915-16.....	6,191	480	7.8
1911-12.....	31,289	4,943	15.7	1916-17.....	9,977	904	9.0

<sup>1</sup> No records.STATEMENT No. 5A.—*Pitometer district A, Survey No. 3.*

## Subdivision survey:

Started, July 2, 1916.  
 Finished, Dec. 3, 1916.  
 Cost..... \$4,806.04

## Population:

Resident—  
 Metered..... 5,947  
 Unmetered..... 11,536  
 Total..... 17,483

Floating—  
 Metered..... 27,561  
 Unmetered..... 8,562  
 Total..... 36,123

## Buildings:

Dwellings—  
 Metered..... 258  
 Unmetered..... 2,092  
 Hotels and apartments—  
 Metered..... 34  
 Unmetered..... 8  
 Municipal buildings—  
 Metered..... 14  
 Unmetered..... 3

## Buildings—Continued.

Federal buildings—		
Metered.....		3
Unmetered.....		3
Factories—		
Metered.....		3
Unmetered.....		3
Restaurants—		
Metered.....		74
Unmetered.....		0
Miscellaneous—		
Metered.....		1,091
Unmetered.....		1,218
Total—		
Metered.....		1,477
Unmetered.....		<u>3,327</u>

Night flow detected by subdivision, per day..... gallons..... 3,740,800

## Due to inside flow—

Metered.....	do.....	1,385,900
Unmetered.....	do.....	<u>754,300</u>

## Due to underground leakage—

Service pipes.....	do.....	619,500
Joints on mains.....	do.....	26,100
Valves.....	do.....	26,200

Total.....	do.....	671,800
------------	---------	---------

## Due to Federal buildings and fountains..... do..... 647,900

## Due to municipal buildings, flush basins, horse fonts..... do..... 201,700

Total flow accounted for..... do..... 3,661,600

Total flow unaccounted for..... do..... 79,200

## STATEMENT 5B.—Pitometer district C, Survey No. 5.

## Subdivision survey:

Started May 1, 1917.		
Finished Aug. 14, 1917.		
Cost.....		<u>\$1,995.42</u>

## Population:

Resident—		
Metered.....		16,194
Unmetered.....		1,130
Total.....		<u>17,324</u>

## Floating—

Metered.....		2,655
Unmetered.....		<u>102</u>
Total.....		<u>2,757</u>

## Buildings:

Dwellings—		
Metered.....		3,903
Unmetered.....		300
Hotels and apartments—		
Metered.....		8
Unmetered.....		0
Municipal buildings—		
Metered.....		12
Unmetered.....		0
Federal buildings—		
Metered.....		0
Unmetered.....		<u>3</u>

## Buildings—Continued.

Factories—			
Metered.....			0
Unmetered.....			0
Restaurants—			
Metered.....			12
Unmetered.....			0
Miscellaneous—			
Metered.....			446
Unmetered.....			21
Total—			
Metered.....			4,381
Unmetered.....			321
Night flow detected by subdivision, per day.....	gallons		1,226,900
Due to inside flow—			
Metered.....	do		534,500
Unmetered.....	do		44,800
Due to underground leakage—			
Service pipes.....	do		138,300
Joints on mains.....	do		35,700
Total.....	do		174,000
Due to Federal buildings and fountains.....	do		146,100
Due to municipal buildings, flush basins, horse fonts.....	do		266,300
Total flow accounted for.....	do		1,165,700
Total flow unaccounted for.....	do		61,200

STATEMENT NO. 5 C.—*Pitometer district D, Survey No. 4.*

## Subdivision survey:

Started, Oct. 22, 1916.			
Finished, Jan. 25, 1917.			
Cost.....			\$2,320.65

## Population:

Resident—			
Metered.....			1,009
Unmetered.....			9,128
Total.....			10,137
Floating—			
Metered.....			2,233
Unmetered.....			291
Total.....			2,524

## Buildings:

Dwellings—			
Metered.....			165
Unmetered.....			2,242
Hotels and apartments—			
Metered.....			17
Unmetered.....			24
Municipal buildings—			
Metered.....			13
Unmetered.....			3
Federal buildings—			
Metered.....			1
Unmetered.....			0
Factories—			
Metered.....			3
Unmetered.....			0
Miscellaneous—			
Metered.....			55
Unmetered.....			180

## Buildings—Continued.

Total—		
Metered.....	255	
Unmetered.....	2,499	
Night flow detected by subdivision, per day.....	gallons..	668,400
		=====
Due to inside flow—		
Metered.....	do....	20,200
Unmetered.....	do....	369,400
Due to underground leakage—		
Service pipes.....	do....	93,500
Joints on mains.....	do....	65,000
		=====
Total.....	do....	548,100
Due to Federal buildings and fountains.....	do....	61,300
Due to municipal buildings, flush basins, horse founts.....	do....	25,400
		=====
Total flow accounted for.....	do....	634,800
Total flow unaccounted for.....	do....	33,600

STATEMENT NO. 5 D AND H.—*Pitometer districts E and H (Miscellaneous).*

## Sub division survey:

Started. Jan. 1, 1917.

Finished. May 11, 1917.

Cost..... \$1,121.99  
=====

## Population:

## Resident—

Metered.....	5,480
Unmetered.....	2,740
Total.....	8,230

## Floating—

Metered.....	1,616
Unmetered.....	131
Total.....	1,747

## Buildings:

## Dwellings—

Metered.....	145
Unmetered.....	682

## Hotels and apartments—

Metered.....	5
Unmetered.....	1

## Municipal buildings—

Metered.....	6
Unmetered.....	0

## Federal buildings—

Metered.....	2
Unmetered.....	0

## Factories—

Metered.....	3
Unmetered.....	0

## Restaurants—

Metered.....	0
Unmetered.....	0

## Miscellaneous—

Metered.....	23
Unmetered.....	24

## Total—

Metered.....	184
Unmetered.....	707

Night flow detected by subdivision, per day..... gallons.. 397,400

## Due to inside flow—

Metered.....	do....	76,100
Unmetered.....	do....	196,300

Night flow detected by subdivision, per day—Continued.

Due to underground leakage—

Service pipes.....	gallons..	\$34,700
Joints on mains.....	do....	1,000
Valves.....	do....	1,300
Total.....	do....	37,000
Due to Federal buildings and fountains.....	do....	0
Due to municipal buildings, flush basins, horse founts.....	do....	68,800
Total flow accounted for.....	do....	378,200
Total flow unaccounted for.....	do....	19,200

STATEMENT No. 5E.—*Pitometer district F, Survey No. 4.*

Subdivision survey:

Started Dec. 8, 1916.		
Finished June 17, 1917.		
Cost.....		\$3,728.82

Population:

Resident—		
Metered.....		31,154
Unmetered.....		4,252
Total.....		35,406
Floating—		
Metered.....		7,181
Unmetered.....		595
Total.....		7,776

Buildings:

Dwellings—		
Metered.....		6,409
Unmetered.....		968
Hotels and apartments—		
Metered.....		23
Unmetered.....		0
Municipal buildings—		
Metered.....		23
Unmetered.....		1
Federal buildings—		
Metered.....		4
Unmetered.....		0
Factories—		
Metered .....		7
Unmetered .....		0
Restaurants—		
Metered.....		20
Unmetered.....		0
Miscellaneous —		
Metered.....		649
Unmetered.....		834
Total—		
Metered.....		7,135
Unmetered.....		1,803

Night flow detected by subdivision, per day..... gallons.. 1,095,600

Due to inside flow—

Metered.....	do....	653,800
Unmetered.....	do....	171,800

Due to underground leakage—

Service pipes.....	do....	156,500
Joints on mains.....	do....	19,500

Total.....

Do.....		176,000
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Due to Federal buildings and fountains.....

Do.....		46,300
---------	--	--------

Due to municipal buildings, flush basins, horse founts.....

Do.....		21,420
---------	--	--------

Total flow accounted for..... do.... 1,069,320

Total flow unaccounted for..... do.... 26,280

## Trunk Main Tests, 1916-17.

Location	Size	Service	District	Date	Shut-off.	Rate.	Flow due to—
New Jersey and Massachusetts Avenues to Ninth and K Streets NW.....	Inches. 30	Gravity	A	July 2, 1916	Not tight.	Gallons daily.	
Do. " Ninth to Thirteenth Streets NW .....	30	do	A	July 9, 1916	O. K.		
K Street, Ninth to Thirteenth Streets NW .....	30	do	A-K	July 16, 1916	O. K.		
New Jersey Avenue, B to L Streets NW .....	E. 30	do	F	July 23, 1916	O. K.		Air valve open.
L Street, New Jersey Avenue to Tenth Street NW .....	26	do	A	July 30, 1916	O. K.		
Thirteenth Street-Florida Avenue, to Park Road NW .....	24	Second high.	O	Sept. 1, 1916	O. K.		
Florida Avenue and Porter to Fifteenth and H Streets NE.....	12	do	Q	Sept. 26, 1916	O. K.	120,500	B. & O. freight shed 107,900; B. & O. fire line open, 21,000. Unaccounted for.
Do. ....	12	do	Q	Oct. 1, 1916	O. K.	16,200	
Twenty-fourth and M to Twenty-fourth and E Streets NW .....	8	First high.	H	Oct. 15, 1916	O. K.		
South end of Asylum grounds for Blue Plains .....	2	do	H	Oct. 22, 1916	O. K.	25,200	
First and Upas Streets to Blue Plains .....	8	do	H	Oct. 29, 1916	O. K.		
Fourteenth and good Hope Road to South end of Asylum grounds.	20	do	H	Nov. 12, 1916	O. K.		
Niehols Avenue and W to Thirtieth and R Streets .....	24	do	H	Nov. 19, 1916	O. K.	12,100	Including 30 squares with small mains; consumption credited to small mains.
Seventeenth and U to Twenty-second and P Streets NW .....	20	do	M	Nov. 26, 1916	O. K.		
Thirteenth and Florida Avenue to Seventeenth and U Streets NW.	24	Second high.	O	Dec. 3, 1916	O. K.		
Pump House to Thirteenth and Florida Avenue NW .....	36	do	O				
Second and Bryant to Lincoln Road and Bryant .....	12-36	do	P	Dec. 10, 1916	O. K.	18,900	Unaccounted for.
Fourth and Channing NE to Tenth and Lawrence .....	12-20	do	P	Dec. 24, 1916	O. K.	12,690	
New Jersey Avenue and B to Second and East Capitol .....	30	First high.	P	Dec. 31, 1916	O. K.		
Do. ....	30	do	D	Jan. 7, 1917	O. K.		
Second and East Capitol to Seventh and G Streets SE .....	36	Gravity .....	D	Jan. 14, 1917	O. K.		
Virginia Avenue and K to Kentucky and Potomac Avenue .....	30	do	G	Jan. 21, 1917	O. K.		
Virginia Avenue and K to Seventeenth and C Streets .....	30	do	D	Jan. 28, 1917	O. K.		
Seventeenth and C SE, to Twentieth and Benning .....	30	do	D	Feb. 4, 1917	O. K.		
Eleventh and K to Seventeenth and Gates Streets NE .....	30	do	F	Feb. 11, 1917	O. K.		
K street between First and Eleventh Streets NE.....	24	do	F	Feb. 18, 1917	O. K.		
Do. ....	24	do	F	Feb. 25, 1917	O. K.	12,000	See leak First and K.
				Mar. 11, 1917	O. K.		

<sup>1</sup> Anacostia.

## ACCOUNTING AND STORES.

SIR: I submit the following summary of the work done during the fiscal year ended June 30, 1917, by the division of accounting and stores under my charge:

## ACCOUNTS.

The expense account and other tables showing in detail the cost of operating the department are submitted herewith. Eight hundred and nine separate accounts were opened during the year and the following miscellaneous work performed:

Vouchers forwarded.....	2,150
Requisitions made.....	728
Letters mailed.....	951
Cards mailed.....	15
Official letters written.....	687
Work orders issued.....	1,813
Files received and forwarded.....	1,227
Pay rolls made.....	1,141
Miscellaneous papers received and forwarded.....	55,105
Records made on cards.....	1,999
Letters filed.....	2,680
Transfers forwarded.....	722
Total.....	69,218

## STOREKEEPING.

The work of this branch, under the supervision of Mr. W. V. Robertson, has been most gratifying.

The value of monthly receipts and issues of material, tools and equipment were as follows:

	Material.		Tools and equipment.	
	Receipts.	Issues.	Receipts.	Transferred, etc.
July, 1916.....	\$37,395.61	\$25,146.90	\$412.14	\$403.29
August.....	42,395.40	36,483.34	600.35	135.36
September.....	33,230.70	30,542.91	1,600.77	32.75
October.....	20,740.06	31,904.07	903.70	44.22
November.....	26,510.25	31,334.87	561.36	2,872.68
December.....	28,311.36	24,479.32	524.09	460.95
January, 1917.....	31,116.86	28,075.50	418.17	33.97
February.....	20,815.76	21,232.55	173.05	30.52
March.....	32,477.34	28,200.62	3,607.54	129.90
April.....	24,963.71	24,603.22	1,144.84	20.48
May.....	20,670.37	24,167.21	504.38	218.79
June.....	18,579.74	22,759.51	282.58	365.78
Total.....	310,157.19	331,880.02	10,732.97	4,748.69
Totals for fiscal year ending June 30, 1916.....	255,174.17	254,945.05	23,461.60	30,379.82
Totals for fiscal year ending June 30, 1915.....	244,152.74	264,838.36	170,140.38	1,915.94

At the close of business June 30, 1917, the total value of material in stock was \$150,489.87 and the total value of tools and equipment in use and in storerooms was \$652,224.94.

The total accountability of the subdivision at this time was \$802,714.81.

A careful supervision over all scrap and old material, which was collected, broken up, weighed, and delivered to the contractor, brought the department \$2,437.28.

The cost of operating the storeroom for the fiscal year 1917 was 3.91 per cent of the value of the material issued and tools and equipment disposed of, a decrease of 0.073 per cent from the cost in 1916. Cost of operating the storeroom for the past 3 years has been as follows:

	Per cent.
1915.....	4.676
1916.....	4.64
1917.....	3.91

The excellent spirit of cooperation which has existed for many years among the employees of this division has contributed greatly to its efficiency and is most gratifying to me.

The SUPERINTENDENT,  
WATER DEPARTMENT.

SAM'L. RIGGS,  
*Clerk, Water Department.*

TABLE I.—*Statement of cash account of the water fund, District of Columbia, including appropriations and outstanding obligations, for the fiscal year ended June 30, 1917, as shown by books of auditor, District of Columbia.*

Balances July 1, 1916:

Cash in Treasury of the United States.....	\$245,372.97
Cash in hands of disbursing officer, District of Columbia.....	3,069.80
	<u>\$248,442.77</u>

Receipts for year:

Water rents.....	636,664.31
Taps and stopcocks.....	5,484.62
Water-main assessments.....	58,119.17
Interest on same.....	3,871.26
Sales of old materials.....	2,019.58
	<u>706,158.94</u>

Repayments for year:

High service 1917.....	20,737.09
1916.....	1,926.53
Salaries, distribution branch, 1917.....	174.00
General expenses, 1917.....	2,651.97
1916.....	57.82
Refunds, 1917.....	4.15
	<u>25,551.56</u>
	<u>980,153.27</u>

Expenditures for year:

Appropriation water department, District of Columbia, 1917—	
Salaries, revenue, and inspection branch.....	32,296.11
Salaries, distribution branch.....	55,683.64
Contingent expenses.....	3,498.92
General expenses.....	17,903.75
High service.....	409,269.91
Refunds.....	1,616.27
	<u>520,268.60</u>

Appropriation water department, District of Columbia, 1916—	
Contingent expenses.....	641.94
General expenses.....	6,164.31
High service.....	157,557.20
	<u>164,363.45</u>

Total water department expenditures.....	684,632.05
Advances account appropriations for Washington Aqueduct, District of Columbia, 1917.....	114,166.67

Balances June 30, 1917:

Cash in Treasury of the United States.....	165,602.94
Cash in hands of collector of taxes, District of Columbia.....	198.27
Cash in hands of disbursing officer, District of Columbia.....	15,553.34
	<u>181,354.55</u>
	<u>980,153.27</u>

Balance to credit of water fund, as above stated.....	181,354.55
Add credit transfers, received after close of fiscal year.....	3,083.83
	<u>184,438.38</u>

Less appropriation balances—

Water department, District of Columbia, 1917.....	23,273.55
High service, 1917, outstanding obligations.....	106,734.72
Water department, District of Columbia, 1916.....	37,531.05
Washington Aqueduct, District of Columbia, 1917.....	5,000.00
Washington Aqueduct, emergency fund, 1917.....	4,166.67
	<u>176,705.99</u>

Leaves unobligated cash balance, June 30, 1917, available for appropriation and carried forward to 1918 accounts.....	7,732.39
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TABLE II.—*Cost of work done by the water department for the year ended June 30, 1917.*

Heads of expenditures.	Per diem and salaries.	Total expenditures.	Charged to general account.	Stable accounts, Dr.		
		Material expended, cuts, and transportation.	New work.	Operating expenses.	General repairs.	Replacement of old work.
Water surveys (detection of leaks).....	\$25,994.82	\$29,201.48	\$2,418.64	\$26,782.84	.....	.....
Installation and maintenance of meters.....	33,358.17	112,664.96	96,414.62	64,169.96	.....	.....
Office of water registrar.....	57,132.38	7,017.58	64,169.96	.....	.....	.....
Inspection and repair of services.....	31,747.74	2,033.48	34,219.22	.....	334,219.22	.....
Trapping water mains.....	2,854.25	2,325.80	5,180.14	5,180.14	.....	.....
New services installed.....	2,706.80	1,955.64	4,662.54	4,662.54	.....	.....
Engineering.....	23,002.64	1,207.55	20,701.19	24,250.19	.....	.....
Stable and hauling account.....	25,854.65	8,233.31	34,088.16	31,823.82	20,309.16	11,514.66
Operation and repairs, valves, fire hydrants, etc. ....	21,467.21	10,366.61	351.88	.....	.....	.....
New street hydrants and fountains erected.....	166.21	3,858.67	551.88	.....	.....	.....
Water mains laid.....	40,363.31	101,010.73	141,314.04	141,314.04	16,700.71	2,135.18
Repairs to leaks.....	12,861.02	3,889.69	16,700.71	.....	.....	.....
Reservoirs, lodges, and towers.....	4,087.47	1,447.08	5,334.55	3,389.37	.....	.....
Care of grounds.....	6,702.17	938.28	7,645.45	7,645.45	7,645.45	.....
Repayment and deposit work.....	13,917.70	15,631.59	20,606.29	20,606.29	.....	.....
Replacement work, lowering mains, etc. ....	5,448.17	12,634.70	18,103.92	.....	818,163.92	.....
Plans, estimates, and leases.....	18,632.28	2,374.21	20,406.49	20,406.49	.....	.....
Care of District pumping station.....	14,373.12	3,812.11	18,155.23	4,539.18	.....	.....
Operating and repairs of pumps, Bryant Street station.....	27,402.47	26,740.16	54,142.63	45,417.20	8,275.43	.....
Operating and repairs of pumps, Reno station.....	26,065.28	1,173.73	2,218.83	2,943.21	2,756.62	.....
Operating and repairs of pumps, Anacostia station.....	3,153.73	1,974.24	5,127.97	4,833.22	294.75	.....
New pumping equipment.....	1,074.61	6,677.17	1,751.78	1,751.78	.....	.....
New buildings.....	18,328.91	6,048.22	24,577.13	12,452.64	.....	.....
Furnished other District of Columbia offices.....	865.23	388.92	1,254.15	1,254.15	.....	.....
Gross expenditures.....	3,383.64	1,084.61	6,388.25	6,388.25	.....	.....
	398,352.08	296,496.73	694,788.81	295,278.57	256,460.77	90,887.39
						18,103.92
						34,088.16
<b>SUMMARY.</b>						
Expenditures:						
Per diem pay rolls.....	\$310,419.20	New work.....	\$295,278.57	Per cent.	\$295,278.57	44.6
Salary pay rolls.....	\$7,932.88	Operating expenses.....	256,460.77		256,460.77	38.8
Total services.....	385,352.08	General repairs.....	90,887.39		90,887.39	13.8
Material expended, cuts, etc. ....	296,496.73	Replacement work.....	18,103.92		18,103.92	2.8
Gross expenditures.....	694,788.81					
Less transportation credit.....	34,088.16					
Net expenditures.....	660,700.65					100.0

TABLE III.—*Statement of the distribution system, including mains laid by the United States, the District of Columbia, and on account of repayment work.*

		In service June 30, 1916.	Laid during year ended June 30, 1917.	Abandoned during year ended June 30, 1917.	In service June 30, 1917.
Diameter:					
3-inch.....	linear feet.....	80,689	1,709	136	82,262
4-inch.....	do.....	152,418	2,765	1,818	153,365
6-inch.....	do.....	1,472,625	2,489	7,432	1,467,682
8-inch.....	do.....	827,569	35,883	1,029	862,423
10-inch.....	do.....	9,109			9,109
12-inch.....	do.....	371,515	5,640	374	376,781
16-inch.....	do.....	17,866			17,866
20-inch.....	do.....	100,061	13,007	35	113,033
24-inch.....	do.....	26,408			26,408
30-inch.....	do.....	57,995			57,995
36-inch.....	do.....	59,437			59,437
42-inch.....	do.....	23			23
48-inch.....	do.....	44,172			44,172
75-inch.....	do.....	600			600
Total.....		3,220,487	61,493	10,824	3,271,156
Stop valves.....		10,029	486	131	10,384
Fire hydrants.....		3,444	164	109	3,499
Public hydrants.....		218	15	4	229
Sanitary fountains.....		16	2		18
Horse fountains.....		153	1	1	153
Public wells (deep).....		44		2	42
Public wells (shallow).....		9		5	4

TABLE IV.—*Statement of the length and cost of water mains laid from July 1, 1878, to June 30, 1917, paid from water department funds.*

		In service June 30, 1916.	Laid during year ended June 30, 1917.	Abandoned during year ended June 30, 1917.	In service June 30, 1917.
Diameter:					
3-inch.....	linear feet.....	77,088	117	54	77,151
4-inch.....	do.....	116,417	1,974	1,771	116,620
6-inch.....	do.....	1,084,183	1,045	5,099	1,080,129
8-inch.....	do.....	775,404	31,883	915	809,372
10-inch.....	do.....	6,741			6,741
12-inch.....	do.....	331,784	5,431	223	336,992
16-inch.....	do.....	17,940			17,940
20-inch.....	do.....	89,998	13,001	29	102,970
24-inch.....	do.....	14,494			14,494
30-inch.....	do.....	20,437			20,437
36-inch.....	do.....	38,248			38,248
42-inch.....	do.....	23			23
48-inch.....	do.....	14,309			14,309
Total.....		2,587,066	56,451	8,091	2,635,426
Total cost to June 30, 1916.....					\$3,772,682.57
Total cost for year ended June 30, 1917.....					141,314.04
Aggregate cost to June 30, 1917.....					3,913,996.61

TABLE V.—*Statement of the average cost per foot for laying water mains for the year ended June 30, 1917.*

Kind of pavement cut.	Size of pipe.	Cost of labor per linear foot.	Cost of material, repairs to cuts, handling, etc.	Total cost per linear foot laid.
<i>Inches.</i>				
Macadam.....	3	.529	\$1,052	\$1,581
Unimproved.....	3	.584	1,271	1,855
Sheet asphalt.....	3	.680	1,467	2,147
Cement.....	4	1,088	1,828	2,916
Granite block.....	4	.482	.618	1,100
Sheet asphalt.....	4	.373	1,412	1,785
Unimproved.....	4	.351	.668	1,019
Cobble.....	4	.354	.811	1,165
Vitrified brick.....	4	.212	1,571	1,783
Sheet asphalt.....	6	1,153	1,006	2,159
Cement.....	8	.576	1,360	1,936
Bri-k.....	8	.342	.775	1,117
Macadam.....	8	.334	.848	1,182
Unimproved.....	8	.338	.826	1,164
do.....	12	.699	1,310	2,009
Sheet asphalt.....	12	.820	1,498	2,318
Macadam.....	12	.496	1,075	1,571
Various.....	20	1,196	3,816	5,012

NOTE.—Excessive cost of small mains due partly to pipe being laid in short sections in alleys, and also to small quantity of some sizes laid.

#### REPORT OF THE WATER REGISTRAR.

WASHINGTON, D. C., October 1, 1917.

SIR: I have the honor to submit the annual report of the revenue and inspection branch of the water department, showing in detail the work accomplished during the fiscal year ended June 30, 1917.

#### INSTALLATION OF METERS.

The work during the year consisted in metering that portion of the first high service embraced in the territory between Tenth and Twenty-first, H and L Streets NW; Thirteenth and Fifteenth Streets, and E Street and Florida Avenue NE.; B Street and river, South Capitol and Third, Seventh and Fifteenth Streets SW.

In the installation this year quite a number of private services were encountered, and being of wrought iron and in a bad condition from long use and corrosion, it was necessary to disconnect the premises supplied through them and connect direct to the water main.

In all cases, as heretofore, where a curb cock or box was missing a new one was installed.

The number of meters installed during the year was 6,877 and the number discontinued was 522, making a total now in use 60,338.

The following shows the average cost of installing a meter:

Meter.....		\$5.75
Material.....		5.09
Labor.....		2.61
 Total.....		13.45

The following shows the average force engaged:

In charge, master plumber (half time <sup>1</sup> ).....	1	1 Laborers.....	13
Plumber.....	1	2-horse team.....	1

The following additional work was performed in connection with the installation of meters: Adjusting meter pits to grade; removing meters for test, etc.; setting temporary meters, etc. This work was handled by the following force:

In charge, master plumber (half time <sup>1</sup> ).....	1	1 Laborers.....	2
Plumbers.....	2	1-horse wagons.....	2

<sup>1</sup> As this man also has charge of taking out meters for test and repairs, etc., only half of his time is properly charged to installation.

In addition to the above, such assistance as may be necessary from time to time is given by the different forces engaged on other work when this class of work becomes heavy.

#### LEAKS AND WASTES.

During the year 37,583 examinations for leaks were made; this included ordinary leaks at house fixtures and the more complicated cases of underground leaks, the detection of which required considerable time and the employment of experienced men.

In all, 551 water services were disconnected at the tap in the main.

The water supply was cut off from 6,225 houses this year during the period of vacancy, which has resulted in the saving of considerable water and has prevented the reoccupying of these houses without the knowledge of the office, thereby insuring full payment for the time water was used.

During the year 6,738 taps and curb cocks were located. This work was done in the advance of meter installation, thereby rendering it unnecessary to defer the installation of a meter on account of the indefinite location of the service. For this purpose the Grove electric indicator was used. This instrument was employed during the year in 1,019 cases.

The subdivision engaged on leaks and wastes also performed the following work: New curb cocks installed or old ones repaired, 144; 20 services repaired; 28 street washers repaired, replaced, or removed; 43 services lowered to grade; 38 private services disconnected; and 110 houses connected direct to mains. They also assist from time to time in the removal of meters for repair and test and replacing them with others. Some of the old services abandoned formerly supplied two or more houses, which accounts for the difference in the number of services.

#### SERVICE CONNECTIONS.

There were 1,419 new service connections made, inspected, and locations recorded during the year; also 733 repairs, etc., to water services and appurtenances were inspected and recorded.

This work has been handled by the regular inspector with some assistance from the office force, and inspections have been made in the majority of cases within one hour of the time specified by the plumber doing the work.

Owing to the reduction in the number of new service connections, the tapper and assistant tapper have been used in connection with leaks and wastes and the taking out and replacing of meters, thus keeping these branches of the work up to date. This detail did not occasion any loss of time in connection with the tapping of water mains, and saved the employment of more men in the subdivision to which the assistance was given.

#### REVENUES.

The table of comparative revenues shows a total collection of \$731,710.50.

There has been a drop in the revenues for water rents this year, which is partly attributable to the decrease in building operations and the consequent lessening of the number of new services installed, and also to the change in the charge for water from the flat rate to the meter rate; a loss which was fully anticipated. From this it will be seen that meters have proved of considerable benefit to the consumers in general from a financial point of view, and their installation has been of the greatest value to the District of Columbia in cutting down the waste of water.

Table 1 shows statement of collections and expenditures.

Table 2 shows comparative statement of revenues.

Table 3 shows number of meters in service.

Table 4 shows consumption of water in buildings owned or controlled by the District of Columbia.

Table 5 shows consumption of water in charitable institutions, hospitals, etc., which receive an allowance of free water.

Table 6 shows general information.

#### WATER RATES.

There has been no change in the water rates during the past year. The rate for domestic purposes is charged according to stories and front feet. On all tenements two stories high with a frontage of 16 feet or less, \$5 per annum; for each additional front foot or fraction thereof, one-third of the charges as computed above.

Business premises are rated according to their size, class, volume of business, and water facilities, and rate from \$1 to \$25. If the flat rate on business establishments

reaches \$25 or more, the owner or occupant is required to install a water meter at his own expense.

*Meter rates.*—A minimum rate of \$4.50 is charged against all consumers supplied with water through meters, which allows the use of 7,500 cubic feet of water during the fiscal year, water used in excess of this quantity being charged for at the rate of 4 cents per 100 cubic feet.

#### CONDITION OF THE WORK.

Notwithstanding the fact that there has been a large increase in business over that of previous years, owing to the change from the flat rate to the meter system, the condition was met without any addition to the force and the work was up to date at the close of the year.

This result was obtained by the faithful cooperation of the employees, for which I now take pleasure in expressing my appreciation.

Very respectfully,

GEO. W. WALLACE,  
*Water Register.*

The SUPERINTENDENT, WATER DEPARTMENT.

TABLE 1.—*Statement of collections and expenditures.*

Water rents:							
Flat rate.....						\$110,173.86	
Meters.....						523,648.99	
Building purposes.....						2,841.46	
							636,664.31
Water main tax, principal and interest.....						\$61,990.43	
Taps and stops cocks.....						5,484.62	
Miscellaneous receipts.....						2,019.58	
							69,494.63
Total receipts.....							706,158.94
Repayments, deposits, and special appropriations.....							25,551.56
Total receipts and repayments.....							731,710.50

TABLE 2.—*Statement of cash receipts and expenditures of the water fund, District of Columbia, for the fiscal years from June 30, 1903, to June 30, 1917.*

Year.	Water rents.	Water main tax, principal and interest on same.	Taps and stopcocks.	Mis- cel- laneous receipts.	Repay- ments, deposits, and special appropri- ations.	Total re- ceipts and repay- ments, balance brought forward.	Receipts and repay- ments, in- cluding balance brought forward from year to year.	Expendi- tures.
1903						\$341,337.37		
1904	\$341,947.53	\$51,713.64	\$6,522.67	\$865.26	\$16,074.20	417,123.30	\$758,460.67	\$708,105.58
1905	352,156.93	32,217.84	8,603.80	2,819.95	27,652.46	423,450.98	473,806.07	437,211.26
1906	362,266.54	34,395.76	9,100.00	23.60	25,187.61	430,873.51	467,568.32	435,661.44
1907	468,889.47	51,319.62	9,487.10	6,254.73	19,912.51	555,863.43	587,770.31	530,379.39
1908	479,981.22	57,462.39	8,688.10	1,376.24	47,984.45	595,492.40	652,883.32	609,240.76
1909	502,804.45	57,654.06	10,674.15	1,530.08	49,875.59	622,628.33	666,270.89	582,502.33
1910	509,769.23	76,905.15	11,794.78	1,715.20	26,498.58	626,682.94	710,361.50	620,243.09
1911	521,581.78	101,987.53	8,824.35	960.04	94,520.49	727,974.19	818,092.00	730,893.58
1912	545,405.47	122,458.81	11,438.65	2,817.50	110,441.39	792,561.82	879,760.24	769,530.18
1913	640,008.64	138,693.75	8,685.50	3,153.81	14,923.91	805,465.61	915,695.67	854,477.38
1914	646,296.15	86,379.21	6,118.20	4,253.20	24,131.64	767,178.40	828,306.69	794,952.16
1915	638,861.89	66,107.56	6,559.89	3,532.77	14,513.50	729,575.61	763,020.14	619,868.85
1916	624,882.18	64,647.80	7,020.80	1,761.39	24,669.76	722,981.93	866,133.22	617,690.45
1917	636,664.31	61,990.43	5,484.62	2,019.58	25,551.56	731,710.50	980,153.27	684,632.05
	7,271,605.79	1,003,933.55	119,002.61	34,083.35	507,424.15	8,561,424.71		8,375,610.25
1918 <sup>1</sup>	613,700.00	63,000.00	6,000.00	2,000.00	-----	<sup>2</sup> 721,700.00		
1919 <sup>1</sup>	647,000.00	63,000.00	6,000.00	2,000.00	-----	<sup>2</sup> 715,000.00		

<sup>1</sup> Estimated.

<sup>2</sup> Estimated total revenue.

TABLE 3.—*Water meters.*

Name.	8-inch.	9-inch.	1-inch.	1½-inch.	2-inch.	3-inch.	4-inch.	6-inch.	8-inch.	Total.
American.....	171	2	10	4						187
American, new model.....	87									87
Crown.....	1	12	33	25	10	7		2		90
Empire.....	48	15	3	1	4	2		1		74
Emare.....		20	23	35	14					92
Eureka.....						1	1			2
Gamon.....	40									40
Gem.....						23	17	9	1	50
Hersey, disk.....		604	46	97	24	16	3	1		791
Hersey, model F.....	23,173					1	2	2		23,173
Hersey, torrent.....						6	6	9	3	5
Keystone, Pittsburgh.....						27	4			24
Keystone, model W.....	12,651		45	45	30	19				12,651
King.....	173	1	3	6	1					184
Lambert.....	1,284	171	128	114	64	21	7	1		1,790
Lambert, special.....	476									476
Nash.....	124	261	386	266	122	43	14	1		1,217
Niagara.....	2	69	65	88	50	2				267
Standard.....					4					4
Thomson.....	1	9	22	28	18	1	1			80
Tri lent, disk.....	2,543	85	113	101	29	2				2,873
Tri lent crest.....					2	7	15		1	25
Tri lent compound.....						3	1			4
Union.....		2	7	3	1					13
Worthington.....	263	50	55	42	24	20	5			459
Worthington, model D.....	46									46
Worthington, model G (old).....	93									93
Worthington, model G (new).....	4,823									4,823
Worthington, model K.....	10,543									10,543
Total.....	56,542	1,337	939	844	406	177	69	16	4	60,333
Registers.....										5
Total meters and registers.....										60,338

TABLE 4.—*Showing consumption of water in buildings owned or controlled by the District of Columbia.*

	Annual consumption.	Premises.	Meters.
	<i>Cubic feet.</i>		
Schools and annexes.....	42,233,110	144	149
Fire-engine houses, etc.....	2,594,800	41	38
Police stations.....	3,648,300	14	14
Playgrounds.....	2,151,300	6	9
Public comfort stations.....	2,047,500	3	3
Stables.....	1,863,500	5	9
Workhouse grounds.....	660,500	7	7
Industrial schools.....	4,840,900	2	5
Miscellaneous.....	6,042,700	27	38
Total.....	66,082,610	249	272

TABLE 5.—*Premises which receive an allowance of free water.*

Name.	Num- ber.	Consump- tion.	Allowance.	Ex- ceeded.	Paid.	Meters.
		<i>Cubic feet.</i>	<i>Cubic feet.</i>			
Churches.....	95	3,178,000	6,266,544	9	\$206.39	109
Homes.....	23	3,871,800	4,274,900	7	280.08	29
Hospitals.....	10	11,255,100	10,489,400	6	786.80	14
Neighborhood houses.....	3	59,800	427,400			4
Orphan asylums.....	7	2,926,800	4,460,316	1	.48	12
Schools.....	14	2,409,100	6,438,845	1	126.44	14
Total.....	152	23,800,600	32,357,405	24	1,400.19	182

TABLE 6.—*General information.*

Average cost of installing a water meter by the department:

Meter.....	\$5.75
Material.....	5.09
Labor.....	2.61

	13.45
Cost of labor and material for maintenance of meters.....	14,731.83
Average cost per meter for maintenance.....	.25

Consumption of water through meters:

District meters.....	cubic feet.....	454,000,000
District meters in municipal buildings.....	do.....	66,082,600
Private meters.....	do.....	554,684,800
Private meters in charitable institutions.....	do.....	23,327,700
Total.....		1,098,095,100

Meters in service.	In use June 30, 1916.	Installed, 1917.	Aband- oned, 1917.	Total in use June 30, 1917.
District meters.....	50,488	6,746	165	57,069
District meters in municipal buildings.....	233	19	6	266
Private meters.....	3,061	109	349	2,821
Private meters in charitable institutions.....	181	3	2	182
Total.....	53,983	6,877	522	60,338

Average cost of reading meters.....	\$0.12
Average cost of computing and making bills.....	.12
Average payment for premises in which meters were installed.....	5.56
Average payment for flat-rate accounts.....	6.97

Difference.....	1.41
-----------------	------

Revenue:	
For metered water—	
District of Columbia meters.....	\$280,741.72
Private meters.....	242,907.27
	\$523,648.99

For flat-rate accounts—	
Water rents.....	110,173.86
Building purposes.....	2,841.46
	113,015.32

Total revenues for the fiscal year 1917.....	636,664.31
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Water services:	
In use June 30, 1916.....	69,761
Installed, 1917.....	1,177
	70,938

Abandoned, 1917.....	463
In use June 30, 1917.....	
Metered.....	70,475
	60,338

Not metered.....	10,137
Percentage of services metered.....	85

## REPORT OF THE SUPERINTENDENT OF SEWERS.

WASHINGTON, D. C., September 22, 1917.

Sir: I have the honor to submit the following report of the sewer division, engineer department, District of Columbia, for the fiscal year ended June 30, 1917:

## DIVISION A.—DRAINAGE STUDIES, PLANS, ENGINEERING DATA.

Studies for the future development of the sewerage system, for new trunk lines as well as important extensions, included during the year the following: For sanitary drainage and separate system sewerage, study was made of the large areas east of the Baltimore & Ohio Railroad north from Bunker Hill Road, for newly-developed areas in Sixteenth Street Heights and Pinehurst subdivisions; also detailed plans were made showing all areas within the District which drain into Maryland; also for drainage works in the Falls Branch Valley north of the Dalecarlia Reservation; also sanitary sewers for developing large areas in Bennings, Hillbrook, and Kenilworth, extending to the easterly boundary of the District, and for newly-developed areas in North Petworth and Piney Branch Valley.

Storm drainage studies were developed for new areas in the Anacostia River Valley, in the vicinity of Brookland, Petworth, Brightwood, Chillum Castle Heights, Massachusetts Avenue Heights, Kingle Valley, and Connecticut Avenue Heights. Detail plans were prepared for the Mount Pleasant and Twelfth Street SE, relief sewers, also for the Janes Creek Valley, South Illinois Avenue and Delafield Place, Luzon Avenue, Kingle Valley, Cleveland Avenue, and the Dalecarlia sanitary trunk sewers, also for the extension of the main drainage works along the East Anacostia River Valley including Stickfoot Branch, Good Hope Run, Burnt Bridge Run, and Scaggs Branch, storm water outlets.

Plans and estimates were prepared for trunk sewers in B Street SW, between Ninth and Twelfth Streets Pennsylvania Avenue, between Second and Third Streets, Fourteenth Street NW, K to Thomas Circle, Seventeenth Street NW, D Street to New York Avenue, and Georgia Avenue between Kennedy and Madison Streets, as well as for extensions of the Fourth Street SE, and Twenty-sixth and D Streets NW, trunk sewers, and for the concrete invert in old Tiber sewer from B Street south to Missouri Avenue.

For the sewage disposal system, plans were prepared for the extension of the Anacostia main interceptor to Bennings and study was made for the extension of this interceptor to the District line, where it is proposed to connect with the intercepting system of the metropolitan sanitary district of Maryland, and for the extension of the Rock Creek interceptor from Boulder Bridge to Military Road.

Plans were prepared for the first section of the upper Potomac interceptor from Rock Creek to Wisconsin Avenue, and preliminary plans were prepared for the location and general design of the proposed Rock Creek pumping station.

The year's work included study for the locations of steam tunnels, steam laterals and electric conduits of the United States central heating, lighting, and power plant, including the plans and locations for vapor-cooling tanks, and necessary changes in existing underground structures to permit the construction of this plant.

During the year the records of operating and mechanical plants have been analyzed and results tabulated, and the comparative study of unit costs both of construction and operation continued. Record charts were prepared for each month of the fiscal year showing the daily water consumption at the main sewerage pumping station and the total consumption for the District of Columbia.

The engineering record for the year included rainfall, run-off, and river-flow data, bacteriological examinations, and a sanitary study of streams entering the District of Columbia to ascertain the degree of pollution by sewage from adjacent Maryland towns, as well as determination of the oxygen content of river waters throughout the year.

## RAINFALL AND RUN-OFF.

Data for run-off studies included rainfall records from 3 automatic recording and 21 ordinary gauges, distributed over 50 square miles of area, as well as discharge and flow-line determinations for excessive storms in a number of the main drainage lines.

The storm of greatest intensity for the year occurred on June 14, 1917, beginning about 12:45 p. m. and lasting about 50 minutes. During this interval, in the northwest section, 2.95 inches of rain fell in 50 minutes.

The following is the record for this storm, as well as for the two other excessive storms of the year:

*Tabulation of the total observed rainfall for the three excessive storms of the fiscal year 1917 as recorded at 24 stations.*

Station No.	Location.	Radial distance in miles.	Total rainfall.		
			Aug. 6, 1916.	June 6, 1917.	June 14, 1917.
1	Pennsylvania Avenue and Thirteenth Street NW.....	0.60	1.74	2.11	
2	Tenth and G Streets NW.....	0.40	.45	1.45	2.00
3	Seventeenth and K Streets NW.....	.60	.75	1.70	2.25
4	Twenty-fourth and M Streets NW.....	1.20	1.46	1.50	2.69
5	Delaware Avenue and C Street NE.....	1.20	.95	1.00	2.10
6	New York Avenue and New Jersey Avenue NW.....	1.20	1.08	.88	2.12
7	Seventeenth and U Streets NW.....	1.40	1.05	1.62	2.50
8	North Carolina Avenue and Seventh Street SE.....	1.60	1.85	1.00	1.33
9	Rock Creek and Massachusetts Avenue NW.....	2.00	( <sup>1</sup> )	1.62	2.00
10	First and O Streets SE.....	2.10	1.61	1.13	1.35
11	Cent Place and Thirty-fifth Street NW.....	2.20	1.15	1.62	1.62
12	Filtration Plant.....	2.20	1.08	1.30	2.95
13	Maryland Avenue and Thirteenth Street NE.....	2.30	1.32	.90	1.75
14	Zoological Park.....	2.40	.90	1.76	2.00
15	Park Road and Holmead Place NW.....	2.40	.75	1.28	2.88
16	Twenty-first and A Streets NE.....	3.00	.79	1.12	1.02
17	Fourteenth and V Streets SE.....	3.00	( <sup>1</sup> )	.80	.88
18	Twelfth and Monroe Streets NE.....	3.30	1.12	1.15	2.28
19	Fourth Street and Nichols Avenue SE.....	3.90	1.02	.95	.72
20	Nebraska Avenue and Tunlaw Road.....	4.20	1.08	1.97	1.07
21	Georgia Avenue and Nicholson Street NW.....	4.40	2.00	1.15	2.05
22	Minnesota Avenue and Gault Place NE.....	4.70	1.55	1.30	1.62
23	Conduit Road and Little Falls Road.....	5.10	( <sup>1</sup> )	2.35	.95
24	Great Falls, Md.....	16.00	( <sup>1</sup> )	1.25	.83

<sup>1</sup> No record.

*Excessive storm of June 14, 1917.*

## DEPTH OF PRECIPITATION.

[Depth in inches at time indicated.]

Gauge.	12.45	12.50	12.55	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35
No. 4, Twenty-fourth and M Streets NW.....	0.17	0.50	0.73	0.91	1.17	1.53	1.93	2.21	2.33	2.39	2.43
No. 10, First and O Streets SE.....	0	0	0	0	0	.03	.47	.87	1.11	1.17	1.17
No. 16, Twenty-first and A Streets NE.....	0	0	0	0	0	.03	.15	.32	.60	.77	.80

## RATE OF PRECIPITATION.

[Depth in inches per hour during periods of time indicated.]

Gauge.	5 min. utes.	10 min. utes.	15 min. utes.	20 min. utes.	25 min. utes.	30 min. utes.	35 min. utes.	40 min. utes.	45 min. utes.	50 min. utes.	55 min. utes.
No. 4, Twenty-fourth and M Streets NW.....	2.04	3.00	2.92	2.93	2.81	3.02	3.31	3.31	3.10	2.82	2.67
No. 10, First and O Streets SE.....	.36	2.82	3.48	3.21	2.73	2.28	1.60	1.85	1.85	1.85	1.85
No. 16, Twenty-first and A Streets NE.....	.36	.90	1.28	1.80	1.80	1.80	1.80	1.80	1.80	1.80	1.80

## MAXIMUM DEPTH OF PRECIPITATION.

[Depth in inches during periods of time indicated.]

Gauge.	5 min. utes.	10 min. utes.	15 min. utes.	20 min. utes.	25 min. utes.	30 min. utes.	35 min. utes.	40 min. utes.	45 min. utes.	50 min. utes.	55 min. utes.
No. 4, Twenty-fourth and M Streets NW.....	0.17	0.50	0.73	0.91	1.17	1.53	1.93	2.21	2.33	2.39	2.43
No. 10, First and O Streets SE.....	.03	.47	.87	1.07	1.14	1.17	1.17	1.17	1.17	1.17	1.17
No. 16, Twenty-first and A Streets NE.....	.03	.15	.32	.60	.77	.80	.80	.80	.80	.80	.80

The precipitation by months for the fiscal year was recorded as follows:

	1916.	Inches.		1917.	Inches.
July.....	4.97		January.....	2.57	
August.....	2.83		February.....	1.97	
September.....	2.57		March.....	5.12	
October.....	1.76		April.....	2.17	
November.....	2.11		May.....	1.84	
December.....	4.03		June.....		6.25
			Total.....		38.19

#### RIVER FLOW AND SEWAGE DILUTION.

The main sewage outfalls of the disposal system at Grimes, on the Potomac River, were under observation throughout the year and the river conditions in the vicinity of the outfalls were given careful study. The general condition of river waters at and below the outfall continued very good throughout the year; the beaches were free from deposits, and examination of river bottom failed to disclose appreciable evidence of sludge deposits. Altogether, however, the conditions were less favorable than during the preceding year. The decreasing ratio of oxygen content in the waters of the dilution basin and in the upper river waters continued noticeable. For example, the ratio of minimum oxygen for July, 1917, was 43:81, while the ratio for July, 1916, was 78:87; and, again, the ratio of minimum oxygen for May, 1917, was 50:92, while the ratio for May, 1916, was 73:94, and the ratio for May, 1915, was 77:98. This indicates a tendency toward a progressive drop in the oxygen content from year to year sufficiently serious to demand attention, on account of the fact that the limit is approaching in the reduction of oxygen content in a portion of the river waters, when fish life will be seriously affected. This condition indicates the need in the near future of the construction of sewage-treatment works. These should be so designed as to maintain a reasonable constant as to the amount of organic matter dependent on dilution for purification. Notwithstanding the especially favorable natural conditions which permit the disposal by dilution of a very large volume of sewage, it must be recognized that, with the continued increase in population of the District of Columbia, the capacity of the river to thus satisfactorily dispose of the sewage before very long will be overtaxed. It is important, therefore, that a primary treatment plant designed to work in harmony with the local conditions afforded by nature for sewage disposal should be installed in the near future. As the design and construction of these works and the acquiring of necessary land for same will require a number of years, it is considered advisable, in the interest of proper sanitation, that initial steps be taken without delay toward the installation of these works. This construction also may be considered as reasonably justified in advancing the standards as to the hygienic cleanliness of river waters.

The following is a tabulation of the flow of the Potomac River for each month of the year, together with the average discharge through the outfall. The latter includes considerable storm water, ground water, and stream flow from suburban areas, as well as leaks and wastes of the water-supply system. The actual ratio to river flow is given in this tabulation, as well as the ratio of effective dilution obtained:

*River flow and sewage dilution.*

Month.	River flow (second-feet).			Mean pumpage (second- feet).	Ratio of mean pumpage to mean river flow.	Mean effective dilution obtained. <sup>1</sup>
	Maxi- mum.	Mini- mum.	Mean.			
1916.						
July.....	41,875	3,010	8,958	96	1:93	193:1
August.....	7,250	2,700	4,578	96	1:48	99:1
September.....	4,085	1,487	3,015	93	1:32	195:1
October.....	4,550	1,612	2,849	87	1:33	61:1
November.....	2,650	1,207	1,940	88	1:22	41:1
December.....	20,000	1,575	3,766	93	1:40	81:1
1917.						
January.....	36,750	4,125	11,600	91	1:127	250:1
February.....	23,750	2,250	9,321	95	1:98	200:1
March.....	113,125	6,687	30,300	98	1:309	611:1
April.....	31,125	6,325	10,018	90	1:111	288:1
May.....	18,125	3,010	7,020	90	1:78	151:1
June.....	25,375	2,487	9,840	97	1:101	212:1

<sup>1</sup> The mean effective dilution ratio represents the ratio of 30 gallons per capita per day to the daily volume of river flow in gallons divided by the contributing population.

During the past 12 months the river flow has fallen below 1,400 second-feet on 4 days, below 1,000 second-feet on 8 days, below 1,800 second-feet on 11 days, and below 2,000 second-feet on 28 days. The minimum flow was 1,200 second-feet on November 9, 1916, and the maximum flow was 113,125 second-feet on March 10, 1917. The mean flow for the year was 8,475 second-feet. The minimum flow for the preceding year was 1,500 second-feet, the maximum flow 152,500 second-feet, and the mean flow 13,300 second-feet.

## TIDAL RANGE.

The automatic recording gauge located at the main sewerage pumping station, on the Anacostia River, about  $1\frac{1}{2}$  miles above its junction with the Potomac River, indicated the following for the fiscal year: Maximum high water, April 5, 1917, 3.5 feet, or 2.6 feet above normal; minimum low water, -4.1 feet, or 1.9 feet below normal.

The maximum range of tide for each month of the fiscal year was as follows:

*Maximum monthly range of tides.*

1916	Tidal range in feet.	1917		Tidal range in feet.
		January.....	February.....	
July.....	5.1	January.....		4.7
August.....	5.1	February.....		4.5
September.....	5.4	March.....		5.0
October.....	5.5	April.....		6.5
November.....	5.8	May.....		5.2
December.....	4.4	June.....		5.1

During the year dissolved oxygen tests were made to determine the condition of the river waters in the vicinity of the main sewerage outfall, as well as similar determinations of samples taken in the upper river for comparison.

The following table gives the maximum, minimum, and mean results of these oxygen tests:

*Comparative oxygen tests of samples of Potomac River water taken near sewage outfall and from the upper river for the past four calendar years.*

Year.	Location samples taken in Potomac River.	Oxygen per cent of saturation.											
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1914....	Mean:												
	Dilution basin.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	68	57	92	83
	Upper river.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	90	84	100	100
1915....	Dilution basin.....	(1)	(1)	100	93	85	90	(1)	(1)	86	88	85	96
	Upper river.....	(1)	(1)	100	100	99	98	(1)	(1)	94	95	97	100
1916....	Dilution basin.....	100	(1)	100	95	86	93	87	77	73	74	74	90
	Upper river.....	100	(1)	99	98	97	92	93	93	88	95	98	100
1917....	Dilution basin.....	100	(1)	100	97	79	83	64	65	.....	.....	.....	.....
	Upper river.....	100	(1)	93	98	96	96	87	90	.....	.....	.....	.....
1914....	Minimum:												
	Dilution basin.....	(1)	(1)	98	74	(1)	(1)	(1)	(1)	54	41	70	77
	Upper river.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	77	73	79	100
1915....	Dilution basin.....	(1)	(1)	95	74	77	80	(1)	(1)	74	76	73	95
	Upper river.....	(1)	(1)	99	100	98	93	(1)	(1)	91	91	94	100
1916....	Dilution basin.....	100	(1)	99	92	73	86	78	74	63	65	65	83
	Upper river.....	100	(1)	100	98	94	84	87	87	81	91	97	100
1917....	Dilution basin.....	100	(1)	100	94	60	73	43	55	.....	.....	.....	.....
	Upper river.....	100	(1)	97	96	92	92	81	86	.....	.....	.....	.....
1914....	Maximum:												
	Dilution basin.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	77	80	100	88
	Upper river.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	100	94	100	100
1915....	Dilution basin.....	(1)	(1)	100	100	96	100	(1)	(1)	98	100	97	97
<del>1916....</del>	Upper river.....	(1)	(1)	100	100	100	100	(1)	(1)	98	100	100	100
1916....	Dilution basin.....	100	(1)	100	98	100	100	96	80	84	84	84	98
	Upper river.....	100	(1)	100	99	100	100	100	99	95	100	100	100
1917....	Dilution basin.....	100	(1)	100	100	98	93	77	77	.....	.....	.....	.....
	Upper river.....	100	(1)	100	100	100	100	93	94	.....	.....	.....	.....

<sup>1</sup> No samples taken.

#### AVERAGE FLOW POTOMAC RIVER IN SECOND FEET.

Year.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1914....	25,178	20,100	24,243	26,362	12,226	4,107	3,962	2,349	1,730	1,921	1,901	7,489
1915....	34,368	33,853	10,341	5,449	7,350	25,398	3,343	8,418	6,668	8,820	4,500	8,332
1916....	15,285	19,416	31,126	24,892	9,983	17,625	8,958	4,578	3,015	2,849	1,940	3,766
1917....	11,600	9,321	30,309	10,018	7,020	9,849	4,830	3,370	.....	.....	.....	.....

#### METROPOLITAN SEWERAGE DISTRICT.

At the 1916 session of the Maryland Legislature an act was passed creating a sanitary district along the border of the District of Columbia and providing for the appointment of a commission to prepare plans and estimates for the sewage of this district with instructions to report same to the legislature which meets in January, 1918, together also with a draft of legislation under which the sewerage would be installed. The plans of this commission are in cooperation with the plans of the District of Columbia for the relieving of park streams within this district of the pollution by domestic sewage from the bordering Maryland towns. These plans contemplate the connection of the Maryland sewers to the sewerage system of the District of Columbia, by this means establishing a permanent and efficient remedy for this stream pollution.

The condition of the park streams where they enter the District has been under observation throughout the year, and the increase in their pollution as indicated by bacteriological determinations has been appreciable. These undesirable conditions are becoming more apparent on account of the recent construction of sewerage systems in the bordering Maryland towns that discharge sewage directly into these streams. As an evidence of the present pollution of these streams the following is a

tabulation of bacteriological determinations of samples of stream waters collected during the year by the sewer department. The results given were obtained by the bacteriological laboratory of the United States Public Health Service. Acknowledgments are due to the Public Health Service for valuable assistance in obtaining this data.

*Bacteriological survey of streams, showing total bacteria and B. coli per cubic centimeter in analysis of samples taken from streams as located.*

Date.	Little Falls Branch at Wisconsin Avenue.		Willetts Brook at River Road.		Rock Creek at Broad Branch Ford.		Anacostia River, Bladensburg Road.	
	Total bacteria. <sup>1</sup>	B. coli.	Total bacteria. <sup>1</sup>	B. coli.	Total bacteria. <sup>1</sup>	B. coli.	Total bacteria. <sup>1</sup>	B. coli.
1916.								
July 12.....	370,000	10,000	3,400	1,000	.....	.....	5,000	1,000
July 17.....	60,000	10,000	23,000	10,000	18,000	100	.....	.....
July 21.....	100,000	.....	400	100	.....	.....	5,000	1,000
July 31.....	100,000	100,000	1,900	10,000	4,000	100	.....	.....
Aug. 14.....	35,000	.....	2,800	1,000	1,000	100	5,400	1,000
Aug. 21.....	64,000	10,000	3,800	100	700	100	12,000	10,000
Sept. 11.....	380,000	100,000	1,200	10	1,200	.....	20,600	1,000
Sept. 25.....	65,000	10,000	1,300	100	2,600	100	4,300	1,000
Oct. 11.....	7,500	1,000	920	100	200	10	4,800	100,000
Oct. 23.....	3,000	.....	540	100	150	10	750	1,000
Nov. 7.....	9,200	1,000	120	10	164	10	82,000	100
Nov. 21.....	52,000	1,000	650	10	230	100	1,100	100
Dec. 7.....	82,000	1,000	420	100	2,200	10	.....	.....
1917.								
Jan. 17.....	55,000	.....	560	100	410	.....	500	100
Jan. 31.....	7,400	10,000	4,370	100	1,750	1,000	800	10
Feb. 21.....	14,400	100,000	1,400	100	4,400	100	.....	.....
Apr. 9.....	3,500	10,000	570	100	200	.....	1,780	100
Apr. 26.....	12,800	1,000	485	100	125	100	.....	.....
May 3.....	.....	.....	.....	.....	.....	.....	2,800	100
May 15.....	34,000	10,000	420	100	1,270	100	.....	.....
May 31.....	.....	.....	.....	.....	.....	.....	2,200	100
June 8.....	35,500	.....	4,500	.....	19,350	10,000	.....	.....
June 13.....	.....	.....	.....	.....	.....	.....	3,850	100
June 21.....	3,540	10,000	2,000	1,000	2,700	1,000	.....	.....
June 26.....	.....	.....	.....	.....	.....	.....	1,570	1,000

<sup>1</sup> Total bacteria on Agar, 37°.

#### DIVISION B.—OPERATION AND MAINTENANCE, SEWERAGE SYSTEM.

The maintenance work of the year included the inspection of the interior of all main trunk sewers, 142.93 miles in length, and the inspection of 1,133 miles of pipe sewers. General repairs were made throughout the system on both main and pipe sewers, and their condition as to maintenance was excellent. The most important maintenance work included the construction of 819.5 linear feet of concrete floor in the B Street storm-water sewer between Fifteenth and Seventeenth Streets NW., repairs to the concrete and brick work of the following important sewers: Fillmore Street trunk, Second Street SE. trunk, Seventeenth Street NW. trunk, old Tiber trunk, Easby Point high level interceptor, New York Avenue trunk, and the I Street NW. trunk sewers; also repairs and improvements were made to the storm-water outlet of the Piney Branch trunk sewer.

The operating work for the fiscal year included the cleaning of 34,707 storm-water catchment basins on permanently paved streets and 4,549 catchment basins on suburban streets and roads. The total quantity of silt removed from the city basins was 5,354 tons and from suburban basins 2,808 cubic yards. This is a decrease of 364 tons from city basins and an increase of 56 cubic yards from suburban basins over the amount removed during the preceding year. The cost of cleaning city basins, including the cost of labor and team haul, but exclusive of disposal, was \$12,165.99, and the cost of cleaning suburban basins was \$2,724.46, a total of \$14,890.45. The average cost of cleaning city basins was \$0.355 per basin, against \$0.297 per basin for the preceding year, and the average cost per ton of silt removed was \$2.27, against \$2.15 for the preceding year. The average cost of cleaning suburban basins was \$0.598 per basin, against \$0.565 per basin for the preceding year, and the average cost per cubic yard of material removed was \$0.97, against \$0.859 per cubic yard for the preceding

year. All material from city basins was delivered aboard scows, removed from the city front, and deposited as fill back of the bulkhead line of the Anacostia River improvement between Poplar Point and Giesboro Point, under permit from the United States Engineer Office. The cost of this disposal, including loading on scows, water transportation, unloading, and grading, was \$5,039.25, and the average cost of this work per ton removed was \$0.941, against \$0.925 for the preceding year.

A total of 42,592 cubic feet of material was removed from sewers and 75,195 cubic feet from the settling chamber of the sewage-disposal system, while 884,755 pounds of screenings were removed from the sewage screens and incinerated.

The following tabulation indicates the total length of sewers at the close of the fiscal year and gives the length and expenditure for 20 years for operation and maintenance, based on the total appropriation for this work, exclusive of sewage-disposal maintenance. This tabulation indicates a reduction in annual expenditure per mile for operation and maintenance in the past 20 years from \$130.62 per mile to \$69.69 per mile. The gradual reduction in cost indicated has been accompanied by largely increased maintenance work and is due to improvements in efficiency and economy in this important branch of the service.

Year.	Length of sewers (miles).	Expen- diture for main- te- nance.	Cost of main- te- nance per mile.	Year.	Length of sewers (miles).	Expen- diture for main- te- nance.	Cost of main- te- nance per mile.
1898.....	382.78	\$50,000	\$130.62	1908 <sup>1</sup> .....	521.18	\$44,500	\$85.38
1899.....	394.92	50,000	126.61	1909 <sup>1</sup> .....	542.03	45,000	83.02
1900.....	408.08	50,000	122.52	1910 <sup>1</sup> .....	567.98	48,500	85.39
1901.....	421.34	50,000	118.67	1911 <sup>1</sup> .....	583.74	50,000	84.70
1902.....	436.89	50,000	132.76	1912 <sup>1</sup> .....	618.53	51,000	84.84
1903.....	448.09	58,000	129.41	1913 <sup>1</sup> .....	644.28	51,000	77.61
1904.....	456.87	58,000	126.95	1914 <sup>1</sup> .....	661.49	50,500	76.30
1905.....	468.86	58,000	123.70	1915 <sup>1</sup> .....	682.11	50,500	74.03
1906.....	484.40	42,000	86.70	1916 <sup>1</sup> .....	702.06	50,000	71.22
1907 <sup>1</sup> .....	501.44	38,000	75.78	1917 <sup>1</sup> .....	717.38	50,000	69.69

<sup>1</sup> Exclusive of sewage-disposal maintenance.

There are now 717.37 miles of main and pipe sewers and 5,651 catchment basins. The work of operation and maintenance includes the inspection, flushing, cleaning, and repairing of all the sewers and appurtenances. The record of cost of all work performed, including the comparative costs with preceding years, together with an accurate daily statement of work performed, is maintained on the card system.

The following summary gives a statement of the amount of work in this division for the fiscal year, with details of expenditure for each class of work performed:

#### Cleaning and repairing, fiscal year 1917.

	Work.	Cost.
CLEANING AND INSPECTION.		
Inspection interior of all main sewers.....	miles.....	142.93
Insp. ction of pipe sewers.....	do.....	1,133
Flushing of pipe sewers.....	feet.....	5,983,299
Flushing of manholes.....		15,397
Flushing of storm-water receiving basins.....		17,958
Inspection and cleaning of gates, regulators, and sumps.....	feet.....	3,662
Cleaning of main sewers.....	do.....	5,467
Cleaning of pip. sewers.....		183,796
Cleaning of basin outlets.....		44
Cleaning of gravel basins.....		5
CLEANING OF STORM-WATER RECEIVING BASINS.		
City basins.....		34,707
Labor.....		2,968.83
Teams.....		9,197.16
Total.....		12,165.99
County basins.....		4,549
Labor.....		950.03
Teams.....		1,774.43
Total.....		2,724.46

*Cleaning and repairing, fiscal year 1917—Continued.*

	Work.	Cost.
CLEANING OF STORM-WATER RECEIVING BASINS—continued.		
Removal by scows:		
Loader.....		\$1,608.63
Transportation.....		1,414.92
Unloader.....		2,015.70
Total.....		5,039.25
Total cleaning of storm-water receiving basins.....		19,929.70
Cleaning sediment chamber.....		1,677.75
Cleaning of screens.....		4,559.23
Silt removed from main sewers.....	cubic feet.	36,134
Material removed from pipe sewers.....	do.	5,837
Silt removed from gravel basins.....	do.	621
Silt removed from storm-water receiving basins, city.....	tons.	5,354
Silt removed from storm-water receiving basins, county.....	cubic yards.	2,808
Silt removed from sediment chamber, main pumping station.....	cubic feet.	75,195
Material removed from screens at main pumping station.....	pounds.	884,755
REPAIRS.		
Relaying pipe sewers and basin connections.....	feet.	497      1,993.02
Abañloning pipe sewers.....	do.	2,088      322.38
Replacing connections to pipe sewers.....	do.	31      310.00
Repairing main sewers.....		2,305.50
Insp ection and repairs to house conn ections to main sewers.....	do.	78      146.00
Sediment filled.....	do.	47      153.53
Reconstruction of manholes.....		15      526.17
Adjusting and repairing manholes.....		128      1,013.73
Abañloning manhol s.....		13      16.27
Replacing manhole frames.....		51      } 610.20
Replacing manhole covers.....		78      }
Constructing basins.....		3      83.14
Adjusting and repairing basins.....		178      1,735.23
Abañloning basins.....		3      13.81
Replacing alley grates.....		38      }
Replacing alley frames.....		38      565.40
Miscellaneous work.....		1,340.35

## DIVISION C.—OPERATION AND MAINTENANCE, SEWAGE-DISPOSAL SYSTEM, PUMPING STATIONS, SHOPS AND YARDS.

Under this division is included the operation and maintenance of the main pumping station, also of substations, gates, and regulators; the mechanical equipment of the sewer division, shops, stores, yards, and floating equipment, as well as the installation of mechanical apparatus and special construction.

The sewage-disposal system was in continuous operation throughout the year, handling the sewage of practically the entire District, as well as the storm water from the 900-acre low area within the dike lines. The various pumping services were maintained without interruption and the preestablished hydraulic levels, both on the sewage and storm-water services, were not varied.

Main pumping station.—Sewage to the amount of 21,972,910,000 gallons and 357,012,000 gallons of storm water were pumped during the year, all the sewage being discharged through the outfall system to mid-channel in the Potomac River at Grimes.

The following is a tabulation of total pumpage by sewage pumps and storm-water pumps for each month of the fiscal year:

*Total pumpage in gallons at the main sewerage pumping station.*

Month.	Sewage.	Storm water.	Month.	Sewage.	Storm water.
July.....	1,948,936,000	42,440,000	January.....	1,824,617,000	25,770,000
August.....	1,926,318,000	22,610,000	February.....	1,731,451,000	16,540,000
September.....	1,800,516,000	23,736,000	March.....	1,984,388,000	51,922,000
October.....	1,744,196,000	13,815,000	April.....	1,739,488,000	14,111,000
November.....	1,704,050,000	18,221,000	May.....	1,811,771,000	12,988,000
December.....	1,867,198,000	37,600,000	June.....	1,880,911,000	77,289,000

The expenditure of coal and other supplies for the year was as follows: Coal, 9,744,860 pounds; cylinder oil, 1,646 gallons; engine oil, 1,002 gallons; miscellaneous oils, 96 gallons; engine grease, 408 pounds; illuminating oil, 2,322 gallons; gasoline, 10,460 gallons. The latter included all usage of the department during the fiscal year. Two thousand one hundred and seventy-two pounds of cotton waste were used and 750 pounds of waste were washed and reused.

*Poplar Point pumping station.*—The Poplar Point pumping station, located at the foot of Howard Avenue, has been in continuous operation throughout the year, handling all the sewage from the east side of the Anacostia River between Poplar Point and Pennsylvania Avenue and discharging same into the main outfalls of the sewage-disposal system.

A total of 452,606,000 gallons of sewage was pumped at this station during the year. The following is a tabulation of the quantities pumped during each month of the year:

*Total pumpage, in gallons, at the Poplar Point pumping station for the year.*

Month.	Sewage.	Month.	Sewage.
1916.		1917.	
July.....	36,031,000	January.....	43,936,000
August.....	32,011,000	February.....	51,679,000
September.....	27,925,000	March.....	73,692,000
October.....	25,368,000	April.....	43,150,000
November.....	19,817,000	May.....	35,347,000
December.....	31,200,000	June.....	32,120,000

The expenditure of coal for the year for heating and incinerating purposes was 106,620 pounds; 98,800 pounds of waste matter was removed from the screens and incinerated.

*Woodridge substation.*—The Woodridge automatic substation, connecting with the upper east side interceptor of the sewage-disposal system and located at Eastern Avenue and Brentwood Road, was operated continuously throughout the year, handling all the sewage in the vicinity of Woodridge, D. C.

Sewage to the amount of 6,450,400 gallons was pumped during the year. Current used was furnished by the Potomac Electric Power Co. at a rate of \$0.06 per kilowatt hour. The average cost of pumpage was \$1.80 per million-foot gallons.

The following is a tabulation of the quantities pumped during each month of the year:

*Total pumpage, in gallons, at the Woodridge substation for the year.*

Month.	Sewage.	Month.	Sewage.
1916.		1917.	
July.....	605,000	January.....	805,000
August.....	443,000	February.....	593,300
September.....	444,000	March.....	541,600
October.....	401,000	April.....	263,700
November.....	425,000	May.....	664,000
December.....	599,000	June.....	665,800

The following are the principal items of betterment for the year:

*Poplar Point pumping station.*—The equipment of the Poplar Point pumping station during the year included the installation of two dynamotors for the operation of the electric level indicators, a screw-type sludge press, with steel hopper and chute for pressing screenings, and a 2-inch two-stage motor-driven centrifugal pressure pump for operating the hydraulic-gate system. The heating system was changed from steam to hot water.

*Woodridge substation.*—At the Woodridge pumping station repairs were made to the armatures of the pumping units; both pumps were given a general overhauling. Bearings were reabbribited, new pump shafts installed, thrust-bearing plates replaced, and units realigned and adjusted. The station was painted during the year.

*Main pumping station.*—The lighting system throughout the building, including the main engine room, sediment chamber, storm-water screen chamber, shops, offices, boiler room, and substructure, was changed from old-style carbon units to the latest type mazda system with new fixtures and reflectors. The total number of lighting units in the station was reduced from 2,105 to 638, and the total load for lighting from 168 to 48 kilowatts. Eight-inch automatic cut-off valves were installed on steam lines of

boilers Nos. 3, 4, 5, and 6. Pipe radiators were installed in storeroom and boiler-room toilets. A metal hydraulic gate-valve board and indicators for distant control of all hydraulic gates was installed in the engine room. Nickel-plated, sanitary bubbling fountains were installed in machine and blacksmith shops and scale house, and a time-recording stamp in the storeroom.

*Repairs and betterments, main pumping station.*—Repairs were made to the copper reheating coils of engine No. 1, Class III; bearings were refitted, gaskets renewed, and low-pressure steam valve drive shaft repaired on engine No. 2, Class I. Piston shaft and bearings were repaired on generator No. 1 and bearings were rebabbitted on generator No. 3. A new shaft was installed, thrust bearings repaired and relined on 3-inch electric drainage pump. Pressure pumping engine for the hydraulic system was thoroughly overhauled and repaired, a new valve drive was installed, piston rod turned, valve seats adjusted, and all parts tightened. An air chamber was installed on boiler-feed pump suction line and overflow connected from main pumping engine thrust bearing to the hydraulic system suction standpipe.

In the boiler room fire-brick arches were renewed on boilers Nos. 1, 2, 5, and 6 and ash-pit lining renewed on boiler No. 5. Cast-iron top extension pieces in furnace hoppers were renewed on boilers Nos. 2, 5, and 6. Bridge walls, fire-brick side walls, cast-iron throat pieces in furnace hoppers, stop valves and feed lines, and tubes renewed in boilers Nos. 1, 2, 3, 4, 5, and 6. The walls of the boiler room were cleaned, whitewashed, steel work painted, and windows repaired. The sludge press in the screen room was repaired and new piston installed on sludge press cage. All sewage screens were thoroughly overhauled, scraped, cleaned, and painted.

Tile floor in the main engine room was repaired and automobile shops and store-room cleaned and painted.

*Stores.*—Supplies, construction materials, and tools purchased during the year were received, inspected, and issued at storerooms and store yards. An accurate daily record is kept on the card system and quarterly reports made covering all expendable and unexpendable property. Annually an inventory of all property is taken in order to verify the accounts and close the records of the year. All property, tools, and equipment unfit for further service were delivered to the auditor's office for condemnation and sale.

*Yard.*—At the concrete plant 119 side basin tops, 76 corner basin tops, 22 special basin tops, 440 cheek blocks, and 154 drip stones were made during the year. Silt from storm-water catchment basins was weighed and loaded onto scows at this yard.

A three-track roller marine railway, 50-foot cradle of 75 tons capacity and having gas engine drive power winch for hauling, was constructed. The erection of a metal paint shop was begun. A new stiff leg was installed on the gasoline derrick unloader and derrick painted, minor repairs were made to the steam derrick, scale house, and roadways.

At the Poplar Point yard construction materials were stored and issued for day labor construction and repair work east of the Anacostia River.

Ink sludge from the settling basins constructed for the Bureau of Engraving and Printing was removed and disposed of by the department. The amount of this material removed and the cost of disposal is given in the following tabulation. The cost of this work was paid from the appropriation for "Material and miscellaneous expenses, Bureau of Engraving and Printing, 1917."

*Material removed and the cost of cleaning the ink-settling basins of the Bureau of Engraving and Printing.*

Date of cleaning.	Tons removed.	Unit cost removal per ton.	Unit cost team haul per ton.	Unit cost transportation and disposal per ton.	Total cost removal transportation per ton.	Total cost removal and disposal.
1916.						
Sept. 15.....	41.0	\$0.42	\$0.67	\$0.67	\$1.67	\$75.30
Oct. 5.....	40.0	.30	.61	.69	1.64	72.33
Dec. 6.....	37.4	.31	.78	.70	1.79	73.70
1917.						
Feb. 26.....	45.5	.32	.64	.69	1.66	83.29
Mar. 20.....	45.3	.27	.65	.71	1.63	82.26
May 11.....	45.0	.28	.65	.70	1.63	90.85
June 21.....	46.0	.28	.64	.69	1.60	80.85
Total and average.....	300.2	.31	.66	.69	1.66	548.58

*Floating equipment.*—During the year the floating equipment was employed in conveying waste materials removed from the sediment chamber, catchment basins, and ashes from the pumping station to the point of disposal; in delivering construction materials to points along the water front, where sewer work was in progress; in transportation in connection with the sanitary survey of the Potomac River; and in the transportation of inspectors and assistant engineers.

On the towboat *Virginia*, a new ignition and lighting accumulator was installed, new shaft and bushing pulley for bilge pump was made, and timing gear for globe engine changed. The engine was overhauled and repaired. Minor repairs were made to the launch. The boiler on the dredge was cleaned and painted and buckets repaired. The pile driver was repaired, cleaned, and painted. One new flush deck scow was constructed, and two scows were cleaned and painted.

*Shops.*—In addition to work in connection with construction and repairs enumerated in preceding paragraphs of this division, work of the shops included all repairs to pumping and other machinery, cleaning wagons, motor trucks, and construction equipment, repairs incident to maintenance and betterment of buildings, and maintenance of electric lighting and power circuits. Twenty basin-cleaning wagons, 1 hose reel, 22 wagons, and 8 carts were repaired, also 4 basin-cleaning wagons, 2 hose reels, 1 wagon, 2 carts, and 2 bugzies were thoroughly overhauled and painted. Small tools were made as follows: Nineteen chisels, 35 drills, 5 wrenches, 142 picks, 54 miscellaneous tools, and 41 signs. Small tools were repaired as follows: Three hundred and ninety-two chisels, 642 drills, 601 points, 3,445 picks, 72 cutters, 10 axes, 103 saws, 8 wrenches, 62 wheelbarrows, 41 mattocks, 11 signs, and 97 miscellaneous tools. Fifteen hundred and forty-five manhole irons were made for construction work. Forms were made for 22 construction and repair jobs.

*Miscellaneous construction.*—Tide gates were built and hung at the outlets of the Twelfth Street SE., Smith's Run, and Ely's Run trunk sewers, a tripping device and bucket was installed in the Seventh and L Streets SW. regulator chamber, and special cast-iron hangers made for the 20-inch cast-iron sewer crossing P Street Bridge.

*Miscellaneous work.*—New piles were driven and repairs made to the various sewer department wharves. Foiring on the wharf at the electric loader and stone plant was repaired.

#### DIVISION D.—CONSTRUCTION, SEWERAGE SYSTEM.

The following is a statement of the length of sewers constructed during the year and the cost of same aggregated for the several construction districts:

Section.	Length.	Cost.
	<i>Feet.</i>	
1. County west of Rock Creek.....	12,519.23	\$25,478.70
2. County east of Rock Creek.....	19,920.02	71,628.59
3. County west of Anacostia River.....	11,379.44	24,159.44
4. County east of Anacostia River.....	19,437.06	66,437.44
5. Washington City.....	17,593.06	98,317.31

The following is a detailed statement of sewers constructed in the various districts:

*Western district, county west of Rock Creek.*—In this area 846.97 linear feet of trunk sewers and 11,672.26 linear feet of service sewers, a total of 12,519.23 linear feet, were constructed as follows: Tennallytown, 308.70 linear feet of service sewers; Chevy Chase, 6,389.01 linear feet of service sewers; Cleveland Park, 615.97 linear feet of trunk sewers and 4,068.30 linear feet of service sewers, a total of 4,684.27 linear feet; Woodley Park, 345 linear feet of service sewers; Georgetown, 11.25 linear feet of service sewers; Arizona, 231 linear feet of trunk sewers and 550 linear feet of service sewers, a total of 781 linear feet.

Five storm-water receiving basins were constructed in this section during the year.

Contract was awarded for the construction of the first section of the Upper Potomac interceptor; also contract was awarded for the construction of the Dalecarlia intercepting sewer through the Dalecarlia Reservation and construction begun during year.

*Central district, county east of Rock Creek.*—In this area 5,077.40 linear feet of trunk sewers, 1,242.20 linear feet of service mains, and 13,600.42 linear feet of service sewers were constructed, as follows: Takoma, 533.50 linear feet of trunk sewers, 184 linear feet of service mains, and 3,922.70 linear feet of service sewers, a total of 4,640.20 linear feet; Brightwood, 2,439 linear feet of trunk sewers, 374.70 linear feet of service mains, and 2,166.60 linear feet of service sewers, a total of 4,980.30 linear feet; Petworth, 703.60 linear feet of trunk sewers, 683 linear feet of service mains, and 3,507.20 linear feet of service sewers, a total of 4,894.30 linear feet; Mount Pleasant, 1,230 linear feet of trunk

sewers and 2,061.22 linear feet of service sewers, a total of 3,291.22 linear feet; Washington Heights, 171.30 linear feet of trunk sewers and 1,758.70 linear feet of service sewers, a total of 1,930 linear feet; Eckington, 184 linear feet of service sewers. Thirty-two storm-water receiving basins were constructed in this section during the year.

The following special work was done during the year: A junction chamber and connection to the Mount Pleasant relief sewer was built by day labor at the intersection of Fourteenth Street and Fourteenth Street Road NW.

Contracts were let and the work completed on the Luzon Avenue trunk sewer crossing Sixteenth Street NW., the Georgia Avenue Branch of the Petworth trunk, between Varnum and Webster Streets NW.

Contracts were let and the work begun on the construction of the Mount Pleasant relief sewer and the Georgia Avenue trunk sewer between Ingraham and Madison Streets NW.

Contracts were also let for the construction of the Piney Branch trunk sewer between Georgia Avenue and Eighth and Hamilton Streets NW., the Delafield Place trunk sewer between Georgia Avenue and Illinois Avenue, and also for the construction of miscellaneous service sewers.

*Eastern district, county west of Anacostia River.*—In this area, between North Capitol Street and the Anacostia River, 1,002 linear feet of trunk sewers and 10,377.44 linear feet of service sewers, a total of 11,379.44 linear feet, were constructed as follows: Brookland, 1,002 linear feet of trunk sewers and 4,487 linear feet of service sewers, a total of 5,489 linear feet; Eckington, 1,147.93 linear feet of service sewers; Trinidad, 24.44 linear feet of service sewers; Langdon, 4,718.07 linear feet of service sewers. Nine storm-water receiving basins were constructed in this section during the year.

The following special work was done during the year: Section No. 2 of the Michigan Avenue trunk sewer, between Eleventh and Randolph Streets, and the Baltimore & Ohio Railroad, was completed. Contract was let for the construction of service sewers in the vicinity of Twenty-seventh and Hamlin Streets NE.

*Eastern district, county east of Anacostia River.*—In this area, east of the Anacostia River, 5,035.19 linear feet of trunk sewers, 2,195.58 linear feet of service mains, and 12,206.29 linear feet of service sewers, a total of 19,437.06 linear feet, were constructed as follows: Anacostia, 2,761.63 linear feet of trunk sewers and 880.43 linear feet of service sewers, a total of 3,650.06 linear feet; Congress Heights, 2,265.56 linear feet of trunk sewers, 2,195.58 linear feet of service mains, and 130.50 linear feet of service sewers, a total of 4,591.64 linear feet; Bennings, 807 linear feet of service sewers; Kenilworth, 10,388.36 linear feet of service sewers. Four storm-water receiving basins were constructed in this section during the year.

The following special work was done during the year: Trunk sewer outlets at Smiths Branch, Elys Run, and Blaine Street between the established bulkhead line of the Anacostia River improvement, east side of Anacostia River, and the shore line, were completed and the construction of the outlet at Scaggs Branch begun during the year. This work was necessary in advance of the filling of the Anacostia River flats by the United States engineer office. The construction of trunk sewers and service mains in Portland Street between First Street and Nichols Avenue was begun. This work was necessary in advance of the grading and improving of this street.

Contracts were let and work begun on the following service sewers: Hillbrook and Kenilworth service sewers, Hunt Place between Forty-eighth and Forty-fourth Streets-Deane Avenue to Jay Street, Jay Street to Sheriff Road, Sheriff Road between Forty-fourth Street and Minnesota Avenue, Minnesota Avenue between Sheriff Road and Kane Place, also Kenilworth Avenue between Polk Street and Eastern Avenue.

Contracts were let for the construction of the Burnt Bridge Run trunk between Railroad Avenue and Minnesota Avenue; Good Hope Run trunk, section 2, between Baltimore & Ohio Railroad and Eighteenth Street; Stickfoot Branch trunk between Baltimore & Ohio Railroad and Nichols Avenue; service sewers in Hayes Street between Forty-fourth Street and Deane Avenue; in Forty-ninth and Eads Streets; in Shannon Place between U and V Streets; V Street between Nichols Avenue and Baltimore & Ohio Railroad and in right of way between V and W Streets; also for the construction of storm-water receiving basins in Portland Street between Fourth Street and Nichols Avenue.

*Washington City district.*—In this area 5,326.83 linear feet of trunk sewers and 12,266.23 linear feet of service sewers, a total of 17,593.06 linear feet were constructed, as follows: Northwest section, 2,960.30 linear feet of trunk sewers and 9,814.20 linear feet of service sewers, a total of 12,744.50 linear feet; northeast section, 710.43 linear feet of service sewers; southeast section, 1,563 linear feet of trunk sewers and 483.20 linear feet of service sewers, a total of 2,046.20 linear feet; southwest section, 803.53 linear feet of trunk sewers and 1,258.40 linear feet of service sewers, a total of 2,061.93

linear feet. Eighty-six storm-water receiving basins were constructed in this section during the year and 42 storm-water receiving basins were reconstructed.

The following special work was done during the year: 1,482.50 linear feet of new concrete bottom was constructed in the old Tiber Creek trunk sewer and 819.50 linear feet of concrete floor was constructed in the B Street storm-water sewer between Fifteenth and Seventeenth Streets NW., replacing the old and defective timber floor in this sewer.

Contracts were let and work completed on the Fourteenth Street trunk between K Street and Thomas Circle NW., Seventeenth Street trunk between D Street and New York Avenue N.W., D Street trunk between Twenty-sixth Street and the river northwest, B Street trunk between Ninth and Twelfth Streets S.W., and the Pennsylvania Avenue relief sewer between Twelfth and Fourteenth Streets S.E.

Contracts were let and work begun on the extension of the Easby Point high level interceptor and the Fourth Street S.E. trunk sewers to the new established bulkhead lines. Contract was let for the construction of the James Creek Valley trunk sewer between N and P Streets S.W.

*Length of main sewers and pipe sewers and number of storm-water basins constructed during the fiscal year ending June 30, 1917.*

Appropriation.	Main sewers.	Pipe sewers.	Storm- water basins.
Linear feet.	Linear feet.		
Main and pipe sewers.....	5,326.83	8,549.90	83
Suburban sewers.....	10,488.84	3,528.55	.....
Assessment and permit.....		48,107.09	.....
Sewage-disposal system.....	2,142.00	52.00	.....
Miscellaneous trust-fund deposits.....		2,150.20	.....
Miscellaneous appropriations.....		503.40	11
Total.....	17,957.67	62,891.14	94

#### RECAPITULATION.

Total length of sewers on June 30, 1917:

Main sewers.....	miles.....	142.93
Pipe sewers.....	do....	574.44
Total.....	do....	717.37
Cost of sewage system, June 30, 1917.....	\$13,569,830.21	
Cost of sewage-disposal, June 30, 1917.....	4,685,165.71	
Total.....		18,254,995.92

The following tabulation shows the construction of the sewerage system, the average cost per mile, the funds appropriated for sewer construction and the approximate population for each year for 20 years.

Year.	Popula- tion.	Approp- riations for con- struction.	Miles con- structed.	Average cost per mile.
1898.....	269,000	\$175,000	17.41	\$10,051.09
1899.....	274,000	158,629	10.18	15,582.44
1900.....	279,000	175,000	12.49	14,011.21
1901.....	284,000	250,000	13.25	18,867.92
1902.....	289,000	230,000	12.87	17,871.02
1903.....	294,000	170,000	16.42	10,353.23
1904.....	300,000	172,000	8.78	19,589.98
1905.....	305,000	168,650	11.99	14,065.89
1906.....	310,000	170,000	15.54	10,939.51
1907.....	315,000	333,000	17.09	19,485.08
1908.....	321,000	281,800	19.74	14,275.58
1909.....	326,000	259,500	18.01	14,408.66
1910.....	331,000	224,975	25.51	8,815.17
1911.....	341,000	219,040	23.18	9,449.53
1912.....	352,000	320,000	24.68	12,965.96
1913.....	353,000	320,000	23.52	13,605.44
1914.....	356,000	345,000	17.21	20,046.48
1915.....	359,000	382,500	20.54	18,622.20
1916.....	360,000	360,800	19.28	18,713.74
1917.....	362,000	425,000	14.89	28,542.71

## SEWAGE-DISPOSAL SYSTEM.

*Rock Creek main intercepting sewer.*—The contract for the construction of section No. 8 of this interceptor was let and work begun during the year. This section embraces the laying of approximately 5,500 linear feet of 3 by 5 foot brick and concrete sewer, between Boulder Bridge and Military Road, along Beach Drive.

A connection between the existing interceptor and that portion under construction was made at Beach Drive and Military Road.

A 20-inch diameter cast-iron pipe was laid across the P Street Bridge and connection made to the Rock Creek main intercepting sewer.

*Anacostia main intercepting sewer.*—The contract for sections Nos. 7, 8, 9, and 10 of the Anacostia main intercepting sewer was let during the year. These sections, approximately 3,000 linear feet in length, will complete the Anacostia main intercepting sewer as far as Benning Road.

## DIVISION E.—MAPS, RECORDS, AND DRAFTING.

Progress has been made in constructing the detail set of maps showing all underground construction, including conduits, gas and water mains, sewers, vaults, building projections, as well as building restriction lines, curb, and street railway tracks.

Detailed drainage studies have been prepared for 210 engineer department files and 82 plats prepared for extension of main and pipe sewers and for receiving basins. Seven files from the health office have required field work to determine availability of various public sewers for house connections; also 65 files have been forwarded, showing assessment on account of connections from parcel property to public sewers for which 65 plats were prepared; 226 engineer department files of miscellaneous nature were acted on, making a total of 508 engineer department files forwarded for action during the entire year.

Fourteen record maps of sewers have been made, thus extending the territory formerly covered by this method of recording sewer construction. The work of making minor repairs to maps, still maintained for use, have been looked after; also the work of posting current construction of these maps has progressed up to date.

The counter tracings, for use by the public for information, have been posted with current construction and newly established or modified surface grades.

The 100 foot scale working maps for the suburban districts have been kept posted to date with current construction, subdivisions, and newly established and modified surface grades. In addition, five old and badly worn working maps have been replaced by new ones.

Two hundred and ninety-seven cards showing assessment to be pending for future sewers have been made, and 123 engineer department files, inclosing plats showing the construction of service sewers abutting assessable property, have been forwarded, through the chief clerk, engineer department, to the assessor.

Twenty-five letters have been forwarded to the health officer, with plats, as notice of newly constructed service sewers where same abutted existing houses; 227 existing houses were reported as abutting service sewers constructed during the year.

Progress has been made on the card index of new subdivisions, 473 of same having been recorded. In connection with this work these subdivisions are also posted on maps, record made, and notice prepared for the assessor upon subdivision of parcel property where same abuts service sewer in order that the proper special assessment may be levied.

Two hundred and thirty-two new grade sheets have been made and recorded for work constructed during the year, and one old and badly worn grade sheet has been replaced by a new sheet.

In order to develop the drainage system in step with the work of the Water Department in its construction of water mains throughout the suburban sections, a general map showing all proposed water mains is kept posted as such work is ordered.

Thirty-two street schedules of the surface division, covering 491 paving jobs, have been given careful consideration and, where necessary, studies prepared for construction, reconstruction, or abandoning of sewers in advance of paving.

Twenty-three surface division grade maps for the establishment of new street grades have been studied with reference to the effect on the drainage system, and where necessary, modifications requested before approval of same.

Plans, estimates, proposals, and specifications have been prepared for the construction of sewers under 30 contracts.

Twenty-six plats and deeds for rights of way have been prepared in connection with the extension of the public sewerage system, and of this number 20 have been acquired.

During the year work was started on a new set of maps on the scale of 50 feet to the inch and showing the location of all gas mains. Seven of these maps were completed.

Progress has been made in the work of eliminating privies, and a card index is maintained listing each privy in the District. Four hundred and eighty-seven privies were inspected with a view of extending the sewer system in order that same might be eliminated. New sewer construction abutted 201 existing privies and the health officer was so notified; sewers were ordered constructed (not yet built) to abut 47 existing privies. Permits were issued by the health officer for the erection of 188 new privies.

#### DIVISION F.—RECORDS AND ACCOUNTS.

The work of this division consists in the preparation of requisitions and vouchers, records of costs of construction, cost keeping, preparing pay rolls, and material and equipment accounting. It included for the year 978 construction jobs, 11,660 foremen's reports, 55,620 card records, 1,263 supply bills, 586 pay rolls, 1,254 requisitions, 172 transfer and refund vouchers, 100 tool and supply orders, 552 engineer department files, 52 letters, and 48,912 miscellaneous reports. The following abstract financial statement for the various sewer appropriations and other sewer funds gives a résumé of the expenditures. The total expenditure on account of sewers for the year amounted to \$819,705.37.

#### SEWERAGE SYSTEM.

##### Cleaning and repairing sewers and basins:

Appropriation.....	\$68,060.00
<b>Expended—</b>	
Mechanics, laborers, and watchmen.....	\$40,634.21
Drivers and gate tenders.....	9,647.56
Inspectors and other per diem employees.....	1,601.82
Construction material and tools.....	1,266.58
Repairs to equipment, equipment and supplies...	9,551.32
Paid surface division for repaving work.....	234.29
Paid engineer department stables for forage, black-smith work, etc.....	4,663.77
Paid purchasing office for salaries.....	329.43
	67,928.98
Unexpended balance.....	71.02

##### Maintenance and operation, sewage pumping service:

Appropriation.....	16,500.00
<b>Expended—</b>	
Mechanics, laborers, and watchmen.....	\$19,699.06
Coal, oil, waste, and other supplies.....	24,059.18
Tools and equipment renewals.....	2,669.80
	46,428.04
Unexpended balance.....	71.96

##### Main and pipe sewers and receiving basins:

Appropriation.....	100,000.00
<b>Expended—</b>	
Contract construction.....	\$41,119.99
Day-labor construction.....	30,963.97
Construction material and tools.....	11,113.57
Inspectors and other per diem employees.....	6,641.94
Paid surface division for repaving work.....	7,539.83
Paid engineer department stables for forage, black-smith work, etc.....	1,083.80
Paid purchasing office for salaries, etc.....	866.89
Paid chief clerk's office for salaries.....	142.50
Paid office of assistant to engineer commissioner for salaries (Capt. Powell's office).....	212.00
Paid disbursing office for salaries.....	56.00
Paid corporation counsel's office for salaries.....	159.90
	99,900.39

Unexpended balance.....	99.61
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## Suburban sewers:

Appropriation.....	\$200,000.00
Expended—	
Contract construction.....	\$37,246.44
Day-labor construction.....	19,886.33
Construction material and tools.....	15,075.89
Inspectors and other per diem employees.....	9,316.51
Paid surface division for repaving work.....	553.71
Paid engineer department stables for forage, blacksmith work, etc.....	1,179.29
Paid purchasing office for salaries, etc.....	1,079.01
Paid chief clerk's office for salaries.....	378.25
Paid disbursing office for salaries.....	128.00
Paid corporation counsel's office for salaries.....	171.65
Outstanding contracts and material to complete same.....	114,900.00
	<u>199,915.08</u>
Unexpended balance.....	<u>84.92</u>

## Assessment and permit work, sewers:

Appropriation.....	125,000.00
Expended—	
Contract construction.....	\$33,383.27
Day-labor construction.....	41,665.62
Construction material and tools.....	17,729.93
Inspectors and other per diem employees.....	6,843.50
Paid surface division for repaving work.....	1,329.74
Paid engineer department stables for forage, blacksmith work, etc.....	970.95
Paid purchasing office for salaries, etc.....	1,041.64
Paid chief clerk's office for salaries.....	171.00
Paid disbursing office for salaries.....	204.00
Outstanding contracts and material to complete same.....	21,570.00
	<u>124,909.65</u>
Unexpended balance.....	<u>90.35</u>

## Miscellaneous trust-fund deposits, District of Columbia:

Unexpended balance of deposits from fiscal year 1916.....	1,150.00
Amount received from various depositors, fiscal year 1917.....	10,409.09
Total.....	<u>11,559.09</u>

## Expended—

Contract construction.....	\$1,500.00
Day-labor construction.....	4,177.40
Construction material and tools.....	1,746.37
Paid surface division for repaving work.....	834.88
Contingent charges for engineering, supervision, wear of tools, etc.....	605.87
	<u>8,864.52</u>

## Inspection, cleaning, and repairing—

Cleaning garage traps.....	210.87
Inspection of vaults.....	64.00
Inspection of conduits.....	7.00

281.87

110 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Sewer construction from miscellaneous appropriations:		
Repayments.....		\$32,114.79
Expended—		
Sewer construction—		
Day-labor construction.....	\$8,388.43	
Contract construction.....	13,970.80	
Construction material.....	2,905.44	
Paid surface division for repaving work.....	44.43	
Contingent charges for supervision, engineering, wear of tools, etc.....	1,167.66	
		26,476.76
Inspection, cleaning, and repairing—		
Inspection and repairs to trunk-sewer connection from houses.....	245.00	
Inspection and repairs to sewer connections from fire hydrants.....	85.00	
Special large size connections to sewers.....	340.00	
Adjusting basins and manholes in connection with surface division work.....	520.00	
Cleaning Bureau of Engraving and Printing ink basins.....	497.59	
Erection and removal of rope barricades from Peace Monument to Eighteenth Street NW, in connection with maintenance of public order (inaugural and other parades).....	3,950.38	
		5,638.03
Total.....		32,114.79

*Summary of expenditures, sewerage system.*

Cleaning and repairing, 1917.....	\$67,928.98
Maintenance and operation, 1917.....	46,428.04
Main and pipe sewers, 1915.....	764.27
Main and pipe sewers, 1916.....	21,895.15
Main and pipe sewers, 1917.....	99,900.39
Suburban sewers, 1915.....	3,773.73
Suburban sewers, 1916.....	50,457.93
Suburban sewers, 1917.....	85,015.08
Assessment and permit work, 1916.....	20,007.77
Assessment and permit work, 1917.....	103,339.65
Permit work, 1917.....	86.67
Miscellaneous trust fund deposits, 1917.....	11,559.09
Miscellaneous appropriations, 1917.....	32,114.88
Condemnation, 1917.....	1,896.80
	545,168.43

Outstanding contracts:

Suburban sewers, 1916.....	14,520.00
Suburban sewers, 1917.....	114,900.00
Assessment and permit work, 1916.....	3,673.00
Assessment and permit work, 1917.....	21,570.00
	154,663.00

The following are payments into the Treasury on account of assessment for service sewers under the appropriations indicated below during the fiscal year 1917:

Suburban sewers.....	\$39.77
Assessment and permit work sewers.....	63,466.54
	63,506.31

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 111

*Sewage disposal system.*

Rock Creek main interceptor:	
Appropriation.....	\$50,000.00
Expended—	
Contract construction.....	\$12,231.50
Day labor construction.....	4,472.92
Construction material and tools.....	2,830.01
Inspectors and other per diem employees.....	725.00
Paid surface division for repaving.....	7,000.00
Paid purchasing office for salaries.....	57.35
Outstanding contracts and materials to complete same.....	22,600.00
	49,916.78
Unexpended balance.....	83.22

*Summary of expenditures, sewage-disposal system.*

Anacostia main interceptor, 1916.....	457.16
Rock Creek main interceptor, 1917.....	27,316.78
Outstanding contracts:	
Anacostia main interceptor, 1917.....	39,500.00
Rock Creek main interceptor, 1917.....	22,600.00
Upper Potomac interceptor, 1917.....	30,000.00
Total sewage-disposal system.....	119,873.94

## Purchase and condemnation of land for rights of way for sewers:

Appropriation.....	2,000.00
Expended, cost of rights of way, titles, and recorder fees.....	1,896.80

Unexpended balance.....	103.20
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*Total expenditures.*

Sewerage system.....	697,934.63
Sewage-disposal system.....	119,873.94
Purchase and condemnation of land for rights of way.....	1,896.80
Total expenditures during fiscal year 1917.....	819,705.37

**ALLOTMENTS.***Statement of expenditures under allotments made to other departments from sewer appropriations, fiscal year 1917.*

Appropriation.	Engineer stables.	Purchasing officer.		Chief clerk, engineer department.	Disbursing office.	Capt. Powell's office.	Corporation counsel's office.	Total.
		Salaries.	Sand wharf.					
Total allotments.....	\$7,897.81	\$2,502.60	\$871.72	\$691.75	\$388.00	\$212.00	\$331.55	\$12,895.43
Expended:								
Cleaning and repairing.....	4,663.77	242.26	\$7.17					4,993.20
Main and pipe.....	1,083.80	605.38	261.51	142.50	56.00	212.00	159.90	2,521.09
Suburban sewers.....	1,179.29	904.66	174.35	378.25	128.00	-----	171.65	2,936.20
Assessment and permit work.....	970.95	692.95	348.69	171.00	204.00	-----	-----	2,387.59
Anacostia main interceptor.....		57.35	-----					57.35
Total expenditures....	7,897.81	2,502.60	\$871.72	691.75	388.00	212.00	331.55	12,895.43

*Statement of expenditures under allotments from outside departments to sewer department during the fiscal year 1917.*

Contingent expenses:

Total allotment.....	\$1,200.00
Expenditures, stationery, printing, and supplies.....	1,165.78

Unexpended balance.....	34.22
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*Statement of expenditures for per diem employees, fiscal year 1917.*

Cleaning and repairing.....	\$2,218.69
Main and pipe.....	6,197.71
Suburban sewers.....	7,225.71
Assessment and permit work.....	5,361.93
Anacostia main interceptor.....	324.00
Rock Creek main interceptor.....	520.00
Total.....	21,848.04

The following is a statement of the unexpended balances of the three principal construction appropriations from 1901 to 1916, inclusive:

Fiscal year.	Main and pipe sewers.	Suburban sewers.	Assessment and permit.	Total.
1901.....	\$1,656.53	\$2,237.61		\$3,894.14
1902.....	2,610.75	6,745.80		9,356.55
1903.....	3,948.39	5,762.88		9,711.27
1904.....	268.70	2,072.54		2,341.24
1905.....	5,676.05	6,926.46		12,602.51
1906.....	7,177.09	4,798.30		11,975.39
1907.....	255.68	11,038.27		11,293.95
1908.....	3,878.93	815.05		4,693.98
1909.....	678.12	570.80		1,248.92
1910.....	622.34	4,486.94		5,109.28
1911.....	489.36	401.36		890.72
1912.....	3,716.32	791.12		4,507.44
1913.....	119.82	13.36	\$118.16	251.34
1914.....	83.43	1,316.55	134.65	1,534.63
1915.....	37.00	441.18	3,785.50	4,263.68
1916.....	17.65	20.00	3,673.75	4,155.02
Total.....	31,236.16	48,438.22	7,712.06	87,830.06

*Statement of expenditures for supervision, inspection, and record on account of underground construction, public-service corporations, and the amounts charged to each of the several corporations for the fiscal year 1917.*

Expenditures:

Supervision.....	\$779.36
Inspection.....	1,068.84
Record.....	378.55
Total.....	2,226.75

Charged as follows:

Potomac Electric Power Co.....	968.33
Chesapeake & Potomac Telephone Co.....	697.87
Washington Gas Light Co.....	396.88
Georgetown Gas Light Co.....	138.57
Washington Railway & Electric Co.....	1.00
Capital Traction Co.....	16.94
Western Union Telegraph Co.....	6.16
Postal Telegraph Co.....	1.00
Total.....	2,226.75

## DIVISION G.—PUBLIC-SERVICE CORPORATIONS, UNDERGROUND CONSTRUCTION.

The work of this branch of the sewer department includes the preparation of permits for the construction of gas mains, electric, telephone, and telegraph conduits and accessories and supervision of the work done thereunder. Plans accompanying each application for a permit are carefully studied to avoid interference with existing and future construction, to assure an economical and orderly occupation of public space, and to prevent unnecessary destruction of tree roots and pavements. During construction the work is regularly inspected, compliance with the terms of the permit are insisted upon, and an accurate record of the location of all work is obtained from field measurements. Record sheets are prepared showing the work in detail and the work is then plotted on record maps and recorded on card system.

The work of the year may be summarized as follows:

Permits prepared upon application.....	1, 150
New record cards made.....	1, 150
New jobs inspected and recorded on sheets.....	1, 147
Inspections of work under construction.....	3, 323
Daily average jobs under construction.....	22
New gas mains laid.....	miles. 4.87
Electric duct laid.....	do. 44.87
Manholes constructed.....	753
Drains from manholes and railway tracks.....	48
Houses connected with gas mains.....	1, 227
Houses connected for electric light and power.....	896

## UNITED STATES GOVERNMENT WORK.

A steam pipe and electric conduit was constructed in alley of square 264, connecting two buildings occupied by the Bureau of Agriculture under a permit issued to the Standard Engineering Co.

## PRIVATE PIPE LINES.

Permits prepared for gasoline and compressed air pipes.....	14
Inspected, located, and plotted.....	12

## PRIVATE VAULTS IN PUBLIC SPACE.

Applications approved.....	19
Vaults inspected, located, and recorded.....	13

## WATER DEPARTMENT CONNECTIONS WITH SEWERAGE SYSTEM.

There were 194 permits issued the water department for drains from fire hydrants, blow-offs, air valves, and watering troughs, and 157 were inspected and recorded.

Certification of noninterference with existing underground construction of record was made in connection with 64 conduits constructed by the electrical department, and 42 letters were written the public-service corporations at request of the surface division.

In addition to the current work of the year, much data was collected as to the location of previously unrecorded vaults, mains, and conduits, but a large amount still remains to be done.

## RECAPITULATION.

*Mileage of drainage system of the District of Columbia.*

Construction during fiscal year 1917:

Main sewers.....	miles.. 3.40
Pipe sewers.....	do... 11.99
Total.....	15.39

Total length of drainage system, June 30, 1917:

Main sewers.....	miles.. 142.93
Pipe sewers.....	do... 574.44
Total.....	717.37

*Cost of drainage system of District of Columbia.*

Construction during fiscal year 1917:

Sewerage system.....	\$275,134.96
Sewage-disposal system.....	13,885.52
Total.....	289,020.48

Total cost of constructing drainage system, June 30, 1917:

Sewerage system.....	13,569,830.21
Sewage-disposal system.....	4,685,165.71

Total.....	18,254,995.92
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Very respectfully, your obedient servant,

ASA E. PHILLIPS,  
*Superintendent of Sewers.*

ASSISTANT TO ENGINEER COMMISSIONER, DISTRICT OF COLUMBIA.

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TABLE NO. 1.—*Sewerage system contract construction, fiscal year 1917.*

Contract No.	Constructed.		Total cost.	Appropriation.	Contractor
	Length.	Size.			
<i>Feet.</i>					
5956	260.00	18 in.....	\$7,060.94	Assessment and permit, 1917.....	Harper-Voight.
	2,662.20	12 in.....			
	492.27	10 in.....			
5795A	281.50	15 in.....	764.27	Main and pipe, 1917.....	W. F. Brenizer Co.
5797	1,898.20	4 ft. by 5 ft.....	{ 2,745.72	Suburban, 1916.....	Geo. Hyman.
	538.00	21 in.....	9,315.82	do.....	
5931	122.40	18 in.....	4,913.80	Assessment and permit, 1916.....	Harper-Voight.
	1,042.55	12 in.....	2,434.38	Suburban, 1916.....	
	1,447.95	10 in.....			
5978	863.30	4 ft. 6 in.....	9,609.63	Main and pipe, 1916.....	W. F. Brenizer Co.
5979	380.00	2 ft by 3 ft.....	1,791.78	do.....	Do.
5980	598.00	Concrete bottom.....	6,508.82	do.....	Do.
5998			34,176.79	Suburban, 1916.....	W. D. Murray Co.

<sup>1</sup> Repaving not reported.

TABLE NO. 1.—*Sewerage system contract construction, fiscal year 1917—Continued.*

Contract No.	Constructed.		Total cost.	Appropriation.	Contractor.
	Length.	Size.			
6026	772.00	3 ft. 6 in.....	\$5,172.13 (\$1,445.00)	Main and pipe, 1916..... Central heating, lighting, and power plant, sewers.	W. D. Murray Co.
6048	649.00	10 in.....	5,052.30	Assessment and permit, 1916.	Do.
6050	12,609.00	12 in.....	3,901.62	Suburban, 1916.....	L. M. Johnston.
6053	615.97	4 ft. 6 in.....	(2)	Assessment and permit, 1916.	Geo. Hyman.
6054	978.00	21 in.....	671.01	Suburban, 1916.....	Do.
6054	156.00	12 in.....	3,160.59	Assessment and permit, 1916.	W. F. Brenizer Co.
6054	247.55	10 in.....	(2)	Assessment and permit, 1916.	Do.
6161			5,914.88	Main and pipe, 1917.....	W. F. Brenizer Co.
6165	746.00	2 ft. by 3 ft.....	3,618.50	.....do.....	Do.
6168	452.00	21 in.....	2,176.57	Assessment and permit, 1917.	L. M. Johnston.
6180			14,055.28	Suburban, 1917.....	W. F. Brenizer Co.
6180			5,107.22	Assessment and permit, 1917.	Do.
6197	ft. 116.50	3 ft 6 in. by 5 ft.....	12,537.86	Main and pipe, 1917.....	W. H. H. Allan Co.
	87.50	2 ft. 9 in. by 4 ft.....	(2)	.....do.....	Do.
6198		New invert.....	9,447.64	Suburban, 1917.....	Do.
6199			(2)	Main and pipe, 1917.....	L. M. Johnston.
6201	998.30	4 ft. 6 in. by 3 ft.....	13,082.66	Suburban, 1917.....	Do.
6202			11,329.93	Main and pipe, 1917.....	W. F. Brenizer Co.
6209	803.53	3 ft.....	6,701.21	Suburban, 1917.....	Do.
6223	533.50	7 ft.....	8,520.05	Main and pipe, 1917.....	W. H. H. Allan Co.
6223	196.60	18 in.....	(2)	Suburban, 1917.....	Do.
6231	516.60	6 in.....	12,671.32	.....do.....	Louis Aiello.
6235	1,901.00	2 ft. 6 in.....	14,781.91	Assessment and permit, 1917.	Do.
6211		12 in.....	6,317.58	.....do.....	Do.
6290			7,4915.88	.....do.....	W. F. Brenizer Co.
6265			(2)	Suburban, 1917.....	Do.
6266			(2)	.....do.....	Do.
6267			5,017.19	Assessment and permit, 1917.	W. H. H. Allan Co.
6269			(2)	Suburban, 1917.....	W. F. Brenizer Co.
6282			(2)	Suburban roads and streets, District of Columbia, 1917.	Do.
6291			7,91.67	Suburban, 1917.....	W. H. H. Allan Co.
6294			(2)	Assessment and permit, 1917.	Wm. F. Cush.
6297			(2)	{Whole cost, 1917.....	W. F. Brenizer Co.
Total	36,425.50		205,499.51	{Suburban, 1917.....	

Repaving not reported.

Work not started.

Reimbursement from appropriation for "Extending Easby Point sewer in west Potomac Park."

\$2,270 paid by "Improvements and repairs, District of Columbia, 1917."

\$1,500 paid by Chas. A. Platt.

\$2,100 paid by "Improvements and repairs, District of Columbia, 1917."

Continued in 1918.

Suspended June 2, 1917.

TABLE NO. 2.—*Sewage-disposal system contract construction, fiscal year 1917.*

Contract No.	Section.	Total cost.	Appropriation.	Contractor.
6027	Anacostia main interceptor, section 6....	(1)	Anacostia main interceptor, 1916.	W. F. Brenizer Co.
6204	Rock Creek main interceptor, section 8....	\$18,106.48	Rock Creek main interceptor, 1917.	Geo. Hyman.
6206	Anacostia main interceptor, sections 7, 8, 9, and 10,	(1)	Anacostia main interceptor, 1917.	W. F. Brenizer Co.

1 Work not started.

2 Work not completed.

TABLE NO. 3.—*Sewer construction under permit system from the appropriation for assessment and permit work for the fiscal year 1917.*

Order No.	Location.	Cost.			Total cost.	Amount returned.	For whom done.
		Length.	Size.	Amount of deposit.			
		Feet.	Inches*	To District of Columbia.	To depositor.		
1	Twelfth Street SW, between E and F Streets.....	39.2	8	\$15.00	\$24.24	\$88.48	E. O. Whitford.
2	Crossing Lincoln Road NE, in line of T Street.....	{ 12 10	12 10 } 75.00	62.63	62.64	125.27	B. Stryker.
	Total.....	71.2	.....	110.00	86.87	86.88	
						173.75	23.12

TABLE NO. 4.—*Sewer construction under the assessment system from the appropriation for assessment and permit work for the fiscal year 1917.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.	
	Feet.	In.			Feet.	In.		
	100.	351.00	12	\$696.98	173.	267.50	12	\$359.71
	101.	{ 29.60	24	574.23	174.	188.50	10	357.69
	102.	392.00	12	574.23	175.	21.13	12	29.86
	103.	132.00	12	285.50	176.	60.00	12	89.47
	104.	530.70	12	830.49	177.	146.80	15	391.65
	105.	100.00	12	112.29	178.	60.00	10	84.08
	106.	123.70	12	390.98	179.	24.00	12	46.80
	107.	145.00	10	297.79	180.	140.08	12	242.26
	108.	200.00	10	208.46	181.	24.44	15	67.95
	109.	41.50	12	149.51	182.	39.80	8	49.99
	110.	228.00	10	379.56	183.	390.00	12	721.26
	111.	80.00	10	124.81	184.	247.00	12	357.27
	112.	75.00	12	178.47	185.	50.00	12	153.85
	113.	167.72	12	375.19	186.	148.00	12	306.57
	114.	{ 40.30	15	251.99	187.	217.30	15	354.82
	115.	103.00	12	188.		150.00	10	200.39
	116.	550.09	15	950.03		231.10	12	374.96
	117.	413.80	12	489.50		250.43	12	357.68
	118.	374.20	10	503.52		193.00	12	379.01
	119.	53.00	10	100.47		256.70	12	481.75
	120.	50.09	10	78.53		300.00	15	789.13
	121.	{ 396.00	15	933.96		253.50	15	669.34
	122.	142.00	12	195.		428.37	12	836.08
	123.	147.00	12	213.10		280.00	12	471.15
	124.	{ 176.00	10	197.		56.00	12	99.53
	125.	347.20	12	779.61		162.00	12	342.84
	126.	92.00	10	223.64		90.00	15	180.08
	127.	156.70	24	640.42				(3)
	128.	193.30	24	651.43		43.00	12	85.45
	129.	196.60	24	593.20		580.20	10	789.03
	130.	390.80	18	767.95		128.13	10	220.48
	131.	75.00	10	195.57		15.82	10	264.39
	132.	40.00	10	94.27		300.00	12	477.45
	133.	50.00	15	106.08		{ 19.00	15	
	134.	335.00	12	437.13		{ 125.00	12	356.80
	135.	150.00	12	184.98		91.50	8	142.13
	136.	166.12	10	256.48		313.00	10	453.22
	137.	623.08	10	928.85		297.00	10	515.92
	138.	203.00	10	248.60		400.00	15	984.97
	139.	265.00	12	563.30		242.00	12	445.55
	140.	504.30	12	622.41		202.90	12	302.78
	141.	77.75	10	190.75		467.40	12	706.40
	142.	109.00	12	236.20		143.40	15	189.70
	143.	25.00	10	51.13		{ 98.80	10	
	144.	130.50	8	187.06		{ 15.00	18	2 559.28
	145.	101.61	10	225.48		{ 231.50	12	
	146.	277.50	10	386.45		{ 88.50	15	541.02
	147.	245.00	12	578.56		75.00	8	2 162.88
	148.	379.30	15	565.06		222.30	10	356.00
	149.	308.00	12	781.97		{ 57.00	12	
	150.	{ 24.20	15	878.92		{ 48.00	10	341.95
	151.	404.20	12	220.				(4)
	152.	92.20	12	151.21				(3)
	153.	98.00	10	134.71				(3)
	154.	214.00	12	322.84		114.00	12	300.29
	155.	325.00	12	435.07		{ 53.50	15	
	156.	210.70	10	164.28		{ 311.00	12	940.18
	157.	349.26	10	479.90		142.00	12	237.59
	158.	348.26	10	775.22		113.00	12	184.10
	159.	344.30	10	587.49		240.00	12	2 511.97
	160.	395.25	10	703.08		389.21	10	681.67
	161.	435.10	10	608.84		421.70	12	603.75
	162.	96.00	12	358.21		382.60	12	674.48
	House laterals.			230.				(1)
	2 man-holes.			231.		1,065.00	12	1,768.72
				232.				(1)
				233.				(1)
				234.		71.30	12	17.63
								2 89.86
	163.	112.50	10	205.04				(1)
	164.	349.00	10	575.86		424.10	12	578.56
	165.	361.00	10	685.56				(1)
	166.	143.00	10	235.12				(1)
	167.	582.00	12	1,010.64		900.00	10	1,457.56
	168.	394.37	12	529.37		212.50	10	2 338.32
	169.	215.13	12	397.77				(1)
	170.	459.60	15	935.44				(1)
	171.	169.40	12	301.13				(1)
	Y branch.			4.16				(1)
				244.				(1)
				245.				(1)
				Total.....		29,732.21	.....	55,444.96

<sup>1</sup> Work to be done in 1918.<sup>2</sup> Repaving not reported.<sup>3</sup> Work canceled.

TABLE No. 5.—*Basin construction from the appropriation for main and pipe sewers, fiscal year 1917.*

Order No.	Basins.	Total cost.	Order No.	Basins.	Total cost.
501.	2	\$179.54	562.		1 \$63.93
504.	1	100.01	563.		2 215.00
505.	1	273.57	565.		1 111.84
507.	1	439.15	567.		1 144.58
510.	2	194.64	569.		2 250.81
513.	3	262.31	572.		1 86.99
514.	2	171.93	575.		2 239.51
515.	1	84.64	579.		5 445.97
517.	1	46.99	591.		2 144.60
518.	1	181.15	592.		2 210.14
519.	2	293.04	596.		2 188.42
520.	1	51.46	598.		1 159.73
522.	1	73.54	600.		2 164.02
523.	1	86.48	601.		1 99.60
526.	1	100.06	607.		1 62.60
531.	1	73.16	609.		1 81.77
532.	1	72.29	611.		5 406.86
534.	1	157.70	612.		4 638.97
538.	2	165.69	617.		1 71.05
545.	1	149.55	619.		1 168.43
546.	2	304.61	620.		2 144.01
547.	1	67.10	621.		2 136.39
553.	3	310.83			
557.	1	60.24	Total.		80 \$319.84
558.	3	314.94			

<sup>1</sup> Repaving not reported.TABLE No. 6.—*Sewer construction from the appropriation for main and pipe sewers, fiscal year 1917.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
		Inches.				Inches.	
500.	House laterals.		\$127.37	561.	83.4 feet.	12	\$246.20
502.	(282 feet.	15	640.78	561.	219.5 feet.	12	492.44
	{15 feet.	12 }		570.	150.9 feet.	15	613.54
	{64 feet.	15		573.	240 feet.	24	895.67
503.	36 feet.	12	264.69	576.	Hangers for gas mains.		211.50
	{19 feet.	10 }		577.	(1).		85.81
506.	(1).		626.85	578.	225 feet.	24	2 1,075.21
508.	{131.8 feet.	18	427.70	581.	House laterals.		195.23
	{56 feet.	12 }		582.	232 feet.	24	2 1,142.81
509.	110 feet.	12	472.87	583.	{30 feet.	24	2 210.34
511.	272.2 feet.	18	1,156.12		{15 feet.	12	
512.	66 feet.	15	240.25	584.	House laterals.		2 40.94
516.	483.1 feet.	12	955.78	585.	55 feet.	21	2 317.96
521.	4 manholes.		546.30	586.	12 feet.	36	2 86.65
524.	2 manholes.		160.79	587.	25 feet.	24	2 176.50
525.	1 manhole.		74.05	588.	11 feet.	12	2 49.30
527.	16 feet.	12	46.31	589.	Replacing defective timbers.		128.78
528.	1 manhole.		50.35				
529.	20 feet.	12	26.02	590.	310 feet.	15	596.94
530.	1 manhole.		59.44	593.	(1).		490.89
533.	93 feet.	12	373.92	594.	(1).		261.66
535.	27 feet.	12	89.53	595.	15 feet.	12	79.22
536.	{301 feet.	15	792.49	597.	1 manhole.		2 115.32
	{9 feet.	12 }		599.	do.		280.34
537.	1 manhole.		2 41.44	602.	Removal facade wall.		138.21
539.	do.		77.98	603.	92.2 feet.	12	209.44
540.	do.		108.54	604.	New bottoms in entering sewers.		
541.	House laterals.		130.54				67.07
542.	20 feet.	12	52.44	608.	171.3 feet.	12	429.93
544.	do.	12	39.33	610.	552.4 feet.	12	1,574.94
548.	58 feet.	12	118.27	613.	2 manholes.		2 219.19
549.	1 junction chamber.		1,198.14	614.	20 manholes.	12	2 225.41
550.	(1).		268.63	615.	1 manhole.		2 231.87
551.	90.71 feet.	18	285.28	616.	103 feet.	24	536.24
552.	365 feet.	12	709.94	623.	{224 feet.	12	838.28
554.	{490.7 feet.	12 }	1,811.03	624.	{104.5 feet.	10 }	68.85
556.	{147.1 feet.	15		625.	1 manhole.		2 656.40
559.	448.5 feet.	12	1,108.85		219.6 feet.	12	
560.	187.2 feet.	15	676.46				
	(1).		83.31	Total	6,878.81 feet.		25,800.88

<sup>1</sup> Placing stone over sewer trenches.<sup>2</sup> Repaving not reported.

TABLE NO. 7.—*Sewer construction from the appropriation for suburban sewers, fiscal year 1917.*

Order No.	Length.	Size.	Total cost.	Order No.	Length.	Size.	Total cost.
		Ft. in.				Ft. in.	
800...	318.7 feet.....		\$488.94	816...	Manhole.....		\$35.90
801...	Bulkhead.....		13.10	817...	Barricades.....		10.39
802...	{ 57 feet.....	24	652.49	818...			(2)
	{ 197.6 feet.....	12 } 12		819...	Manhole.....		41.65
803...	Manhole.....		85.81	820...	Resurface.....		84.73
804...	71.5 feet.....		347.21	821...	33 feet.....	12	312.44
805...	{ 200 feet.....	3	1,403.95	822...	11.25 feet.....	15	131.02
	{ 24 feet.....	24 }		823...	130 feet.....	18	311.58
806...	Manhole.....		69.41	824...	372.6 feet.....	24	1,083.76
807...	{ 19.8 feet.....	24	1 516.88	825...	132.7 feet.....	12	277.87
	{ 106.2 feet.....	18 }		826...	112 feet.....	3	930.92
808...	131 feet.....	3	1,094.68	827...	95.5 feet.....	24	415.52
809...	Manhole.....		58.86	828...	184 feet.....	18	760.97
810...	Junction chamber.....		282.15	829...	120 feet.....	4	938.60
811...	Sewer connections.....		31.42	830...	Test holes.....		424.75
812...	211.4 feet.....	12	523.51	831...	Manhole.....		(2)
813...							
814...	401.8 feet.....	21	1,320.26				
815...	117.8 feet.....	15	241.17				
	{ 24 feet.....	18 }					
	{ 30 feet.....	24 }	142.78				
					Total	3,191.85 feet.....	
							13,032.72

<sup>1</sup> Repaving not reported.<sup>2</sup> To be done in 1918.

TABLE No. 8.—*Sewer construction under the whole cost system from miscellaneous trust fund deposits for fiscal year 1917.*

Order No.	Location.	Length. Feet.	Size. Inches.	Remarks.	Amount of deposit.	Cost of work.	Amount returned.	For whom done.
1000	In Monument Grounds and in B Street NW.....			Rope barricade.....	\$40.00	\$39.34	\$0.66	Citizens' Independence Day Committee.
1001	Fifteenth and B Streets NW, (old B Street trunk sewer).....			10-inch gas pipe in arch, 2 manholes.....	35.00	10.99	24.01	Washington Gas Light Co.
1002	Roadway south from Bennington Road, between Anacostia Road and B. & O. Alley, square 2383.....	163	15	1 manhole.....	200.00	198.52	1.48	C. A. Brickwedge.
1003	East roadway of North Capitol Street, crossing V Street.....	75.7	10	{ 3 feet 4 inches by 3 feet 4 inches box drain, 1 manhole.....	275.00	227.88	47.12	J. E. Phillips.
1004	Alley, square 3037.....	135	10	{ 3 feet 4 inches box drain, 1 manhole.....	100.00	95.08	2.59	S. B. Passmore.
1005	Alley, square 1539.....	57	8	{ 1 manhole.....	100.00	73.73	1.73	R. S. Hart.
1006	do.....	53	8	{ 1 manhole.....	100.00	72.45	27.55	Harry Wardman.
1007	Alley, square 68.....	22	8	{ 1 manhole.....	75.00	78.25	46.75	Wm. P. Marshall.
1008	Alley, square 2383.....	92.5	10	{ 1 manhole.....	255.00	203.63	51.37	James L. Marshall.
1009	Twelfth Street NW, crossing Pennsylvania Avenue.....	130	12	{ 1 manhole.....	1,050.00	592.26	457.74	Boyle-Robertson Construction Co.
1010	Twelfth Street NW, Pennsylvania Avenue, and E Street.	133.3	12	1 manhole.....	1,650.00	722.86	327.14	Do.
1011	Twelfth Street NW, south from E Street.	133.3	12	{ do.....	1,650.00	685.08	364.92	Do.
1012	E Street NW, Eleventh and Twelfth Streets.	98	10	{ Wooden basin.....	160.00	113.04	46.96	Swartzell, Rheem & Heisley.
1013	Fourth and Taylor Streets NW, Twelfth Streets.	38	10	{ 3 manholes.....	200.00	194.68	5.32	Boyle-Robertson Construction Co.
1014	E Street NW, Eleventh and Twelfth Streets.	32.8	12	2 manholes.....	550.00	441.00	100.00	James L. Marshall.
1015	Alley, square 2327.....	179	10	2 manholes.....	200.00	170.27	29.73	M. R. Youlton.
1016	Pennsylvania Avenue NW, east of Eighteenth Street.	117.5	10	1 manhole.....	60.00	48.47	11.33	George A. Fuller Co.
1017	Pennsylvania Avenue NW, Thirteenth Street NE, "D" and E Streets.	63.5	12	1 manhole.....	140.00	98.75	41.25	Harry A. Kite.
1018	Pennsylvania Avenue NW, Sixth and Seventh Streets.	36.	12	2 post-hole sockets.	275.00	133.86	141.14	Boyle-Robertson Construction Co.
1019	Pennsylvania Avenue NW, Sixth and Seventh Streets.	24	12	2 manholes.....	100.00	71.46	28.54	Morris & Co.
1020	Roadway between Georgia Avenue and Ninth Street (south of parcel 10318).	312.3	10	2 manholes.....	450.00	307.54	82.46	G. S. Seek.
1022	Crossing K Street NW, west of Thirty-third Street.	55	6	2 post-hole sockets.	73.09	73.09	Oscar Vogt.	Boyle-Robertson Construction Co.
1023	Pennsylvania Avenue NW, Sixth and Seventh Streets.	.....		50.00	7.41	42.59		
1024	Monument Grounds.....	30	12	Rope barricade.....	80.00	70.92	9.08	John Serpico.
1025	Alley, square 250.....	155	24	1 manhole.....	135.00	87.29	47.80	Robert Lee O'Brien.
1026	G Street NW, Eighteenth and Nineteenth Streets.....	100	10	{ do.....	50.00	40.35	9.66	Charles Greig.
1027	Pennsylvania Avenue NW, Fourteenth Street eastward.....	100	10	{ do.....	1,075.00	1,992.61	82.39	R. S. Davis.
1028	Alley, square 2509.....	45	10	{ Rope barricade.....	200.00	188.93	11.07	W. L. Browning.
1029	Monument Grounds.....	.....		{ 1 manhole.....	80.00	(2)	80.00	C. J. Calhoun.
1030	Quince Street NW, Thirteenth and Fourteenth Streets.....	2,305.9	.....	140.00	105.52	34.48	Thrift Building Co.	
	Total.....							9,698.09
								7,282.13
								2,415.96

<sup>a</sup> Work canceled.<sup>1</sup> Repaving not reported.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 121

TABLE No. 9.—*Sewer construction from miscellaneous appropriations, fiscal year 1917.*

Order No.	Location.	Work done.	Total cost.	Appropriation.
1100	Georgia Avenue NW., north of Rock Creek Church Road.	1 basin.....	\$25.10	Suburban roads and streets, Georgia Avenue NW., grading and improving.
1101	Fifteenth and U Streets NW.....	do.....	103.13	Repairs to streets, 1917.
1102	Pennsylvania Avenue NW., east end of bridge across Rock Creek.	3 basins.....	183.18	Pennsylvania Avenue Bridge crossing Rock Creek.
1103	Sixth and Q Streets NW.....	1 basin.....	88.51	Improvements and repairs, 1917, repairs to streets.
1104	Marion Street NW., south of R Street.	do.....	61.93	Do.
1105	M Street NW., at Sixth and at Six-and-a-half Streets.	2 basins.....	213.87	Do.
1106	Sixth and O Streets NW.....	1 gutter drop <sup>1</sup> .....	4.95	Do.
1107	Twenty-tenth and Q Streets NW.....	1 basin.....	102.66	Do.
1108	Thirteenth and Florida Avenue NW.....	3 basins.....	201.56	Suburban roads and streets, 1917.
1109	Seventeenth and H Streets NW.....	1 basin.....	73.10	Improvements and repairs, 1917, repairs to streets.
1110	Pennsylvania Avenue SE., east of Commodore Barney Circle.	do.....	33.40	Improvements and repairs, 1917, southeast schedule.
1111	Fourteenth Street NW., Q and T Streets.	3 basins.....	338.14	Repairs to streets, 1917.
1112	Fourteenth and D Streets SW.....	1 basin.....	6.05	Improvements and repairs, 1917, sidewalks and curbs.
1113	New Hampshire Avenue and Princeton Place NW.....	do.....	66.54	Suburban roads and streets, 1917, Princeton Place, Georgia Avenue to Rock Creek Church Road.
1114	Front of Municipal Building.....	Rope barricade.....	16.50	Maintenance of Municipal Building, 1917.
1115	Pennsylvania Avenue NW., Peace Monument to Seventeenth Street.	do.....	361.36	Emergency fund, 1917.
1116	Florida Avenue NE., Eighth and Ninth Streets.	1 manhole and connection.	96.81	New Women's Dormitory, Columbia Institution for the Deaf.
1117	First and B Streets SW.....	2 basins.....	225.97	Improvement and repairs, 1917, southwest schedule.
1118	Holmead Place NW., Spring Road and Perry Place.	do.....	92.38	Suburban roads and streets, 1917, Holmead Place, Otis Place to Spring Road.
1119	Connecticut Avenue and Rhode Island Avenue NW.....	1 basin.....	74.54	Improvements and repairs, 1917, repairs to streets.
1120	Grounds of the National Museum.	15 feet of 24-inch pipe, 90 feet of 18-inch pipe.	250.00	National Museum.
1121	Third Street SW., B Street to Missouri Avenue.	8 basins.....	457.13	Improvements and repairs, 1917, Third Street west, Pennsylvania to B Street south.
1122	Pennsylvania Avenue NW., Peace Monument to Eighteenth Street.	Rope barricade.....	522.70	Emergency fund, 1917.
1123	Front of the Municipal Building.	do.....	17.26	Maintenance of the Municipal Building, 1917.
1124	Twenty-seventh and K Streets NW.....	1 basin.....	10.44	Improvements and repairs, 1917, northwest schedule.
1125	Alley of square 692.....	No. 1 alley basin..	51.41	Improvement and repairs, 1917, assessment and permit, streets.
1126	Twenty-sixth and K Streets NW.....	1 basin.....	14.20	Improvements and repairs, 1917, northwest schedule.
1127	Front of the Municipal Building.	Rope barricade.....	37.37	Maintenance of the Municipal Building, 1917, miscellaneous Streets, 1917, assessment and permit work.
1128	N and Kirby Streets NW.....	1 basin.....	40.64	Electrical department, 1917, lighting.
1129	Fifteenth and New York Avenue NW.....	Post-hole socket.....	5.90	Improvements and repairs, 1917, northeast schedule.
1130	K Street NW., Eleventh and Twelfth Streets.	3 basins.....	224.39	Improvements and repairs, 1917, Do.
1131	Seventh and B Streets NW.....	1 basin.....	110.30	Improvements and repairs, 1917.
1132	Eleventh and I Streets NE.....	3 basins.....	187.89	Do.
1133	G and One-half Streets SW.....	1 basin.....	81.85	Improvements and repairs, 1917, repairs to streets.
1134	B Street NW., Ninth to Twelfth Streets.	10 basins.....	690.26	Improvements and repairs, 1917.
1135	Nineteenth and E Streets NW.....	1 basin.....	70.52	Improvements and repairs, 1917, repairs to streets, avenues, and alleys.

<sup>1</sup> Abandoned.

TABLE No. 9.—*Sewer construction from miscellaneous appropriations, fiscal year 1917—Continued.*

Order No.	Location.	Work done.	Total cost.	Appropriation.
1136	Sixth Street NE., H Street to Florida Avenue.	1 basin .....	24.43	Improvements and repairs, 1917, northeast schedule.
1137	.....do.....	5 basins.....	32.37	Do.
1138	Seventh and T Streets NW.....	2 basins.....	232.98	Improvements and repairs, 1917, Seventh Street, R Street to Florida Avenue.
1139	Twenty-eighth and Q Streets NW.	1 basin.....	97.33	Improvements and repairs, 1917, repairs to streets.
1140	Thirtyeighth and Q Streets NW.....	4 basins.....	266.02	Do.
1141	Portland Street, Nichols Avenue SE., to Fourth Street SW.	(1).....	.....	Assessments and repairs, 1917, streets.
1142	Rock Creek main interceptor, Beach Drive to Military Road.	120 feet, 2 feet by 2 feet 6 inches. <sup>2</sup>	1,675.88	Sewage disposal system, 1917, Rock Creek main interceptor.
1143	Alley of square 2539.....	1 basin.....	245.72	Improvements and repairs, 1917, assessment and permit work, streets.
1144	Alley of square 2540.....	do.....	226.97	Do.
1145	Twenty-third Street NW., south of Q Street.	60 feet of 12-inch pipe sewer.	391.04	Sewage disposal system, 1917, Rock Creek main interceptor.
1146	Church Street NW., Seventeenth and Eighteenth Streets.	2 basins.....	141.41	Improvements and repairs, 1917, repairs to streets.
1147	S Street NW., west of Thirteenth Street.	1 basin.....	144.40	Do.
1148	Fifteenth and V Streets NW.....	do.....	16.05	Do.
1149	Thirteenth and W Streets NW.....	do.....	138.07	Do.
1150	Thirteenth and Florida Avenue NW.	do.....	99.30	Do.
1151	Tennessee Avenue NE., Fourteenth to F Streets.	3 basins.....	342.40	Improvements and repairs, 1917, northeast schedule.
1152	Beach Drive (Rock Creek Park), north of Boulder Bridge.	Resurface.....	147.53	Sewage disposal system, 1917, Rock Creek main interceptor.
1153	Rock Creek Park, Boulder Bridge to Military Road.	Removing dirt <sup>3</sup> .....	.....	.....
1154	First Street NW., R Street and Florida Avenue.	3 basins.....	232.38	Improvements and repairs, 1917, repairs to streets.
1155	Under the P Street Bridge, across Rock Creek.	164 feet 20-inch cast-iron pipe, 112.7 feet 21-inch terra-cotta pipe. <sup>2</sup>	2,110.87	Sewage disposal system, 1917, Rock Creek main interceptor.
1156	First and B Streets SE.....	1 basin <sup>2</sup> .....	83.44	Improvements and repairs, 1917, repairs to streets.
1157	First and B Streets SE., to First and C Streets NE.	5 basins.....	31.71	Do.
1158	Municipal Bathing Beach (colored pool).	Cleaning drain pipe.	5.26	Streets, 1917, bathing beach, repairs.
1159	Pennsylvania Avenue NW., Peace Monument to Seventeenth Street.	Rope barricade....	542.27	Preservation of public order, Confederate Veterans' Encampment, 1917.
1160	Front of the Municipal Building.....	.....do.....	20.06	Maintenance of the Municipal Building, 1917, miscellaneous.
1161	Connecticut Avenue NW., at Klinge Road bridge.	4 basins.....	530.35	Suburban roads and streets, 1917, Connecticut Avenue and Klinge Road.
1162	Monument Grounds, Seventeenth and C Streets NW.	Rope barricade....	(4)	.....
1163	Coleman Park (Rock Creek Park), at Roosevelt Drive.	{270 feet 8-inch..... 342 feet 6-inch.....	500.00 585.19	Care and improvement of Rock Creek Park.
1164	Fourteenth Street SE., Massachusetts and Pennsylvania Avenues.	1 manhole.....	11.55	Sewage disposal system, 1917, Rock Creek main interceptor.
1165	Twelfth Street NW., E and F Streets.	2 basins.....	100.61	Improvements and repairs, 1917, southeast schedule.
1166	Fourteenth and C Streets SE.....	4 basins.....	299.68	Improvements and repairs, 1917, Twelfth Street NW., E and F Streets.
	Total.....	.....	14,417.20	Improvements and repairs, 1917, southeast schedule.

<sup>1</sup> Work not started.<sup>2</sup> Repaving not reported.<sup>3</sup> Work suspended.<sup>4</sup> Work canceled.

TABLE No. 10.—*Inspectors and other employees of the sewer division, temporarily employed, and the appropriations from which paid, fiscal year 1917.*

Appropriations.	Inspectors.	Overseers.	Other employees.	Total.
Construction, sewerage system:				
Main and pipe sewers.....	\$3,118.83	\$1,119.25	\$1,959.63	\$6,197.71
Suburban sewers.....	3,617.71	507.00	3,101.00	7,225.71
Assessment and permit work.....	1,645.93	1,475.00	2,241.00	5,361.93
Construction, sewage-disposal system:				
Anacostia main interceptor.....			324.00	324.00
Rock Creek main interceptor.....	270.00	250.00		520.00
Maintenance: Cleaning and repairing.....	1,001.44	78.00	1,139.25	2,218.69
Total.....	9,653.91	3,429.25	8,764.88	21,848.04

TABLE No. 11.—*Average cost of constructing pipe sewers and storm-water receiving basins for fiscal year 1917.*

Size of sewer.	Unit cost per foot.		Total cost per foot.
	Labor.	Material.	
8-inch diameter.....			\$0.79
10-inch diameter.....	.85	.44	1.29
12-inch diameter.....	.96	.56	1.52
15-inch diameter.....	1.11	.68	1.79
18-inch diameter.....	1.19	.95	2.12
21-inch diameter.....	1.25	1.31	2.56
24-inch diameter.....	1.31	1.37	2.68
Storm-water receiving basins, each.....	44.12	32.59	76.71

TABLE No. 12.—*Average cost of constructing pipe sewers for 15 years.*

Year.	8-inch diameter.		10-inch diameter.		12-inch diameter.		15-inch diameter.		18-inch diameter.		21-inch diameter.		24-inch diameter.	
	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.	Labor.	Material.
1903.....	\$0.80	\$0.36	\$1.03	\$0.53	\$1.09	\$0.54	\$1.32	\$0.73	\$1.52	\$0.81	\$1.57	\$1.06	\$1.74	\$1.32
1904.....	.97	.36	.92	.55	1.17	.65	1.45	.81	1.61	.91	1.94	1.24	2.24	1.47
1905.....	.98	.38	.96	.55	1.19	.60	1.41	.77	1.45	.89	1.92	1.01	1.87	1.43
1906.....	.87	.33	1.19	.47	1.26	.54	1.41	.67	1.53	.78	1.88	.93	2.45	1.24
1907.....	1.42	.43	1.43	.48	1.30	.56	1.46	.70	1.82	.85	2.09	.98	2.78	1.26
1908.....	1.34	.42	1.26	.50	1.44	.61	1.69	.75	1.91	.90	1.74	1.14	3.65	1.50
1909.....	1.34	.36	1.16	.36	1.46	.46	1.59	.56	1.58	.62	1.67	1.07	1.91	1.18
1910.....	1.00	.29	.99	.35	1.12	.43	1.19	.52	1.49	.66	1.52	.85	1.72	1.14
1911.....	1.01	.27	1.02	.32	1.17	.40	1.36	.52	1.64	.67	1.50	.75	1.82	1.08
1912.....	1.06	.25	1.08	.33	1.20	.39	1.46	.56	1.63	.67	1.70	.88	1.76	.98
1913.....	1.02	.26	1.07	.29	1.35	.38	1.53	.58	1.74	.75	1.93	1.08	2.20	1.28
1914.....	.78	.28	1.08	.45	1.32	.51	1.44	.69	1.56	.89	1.69	1.34	2.11	1.41
1915.....	.58	.19	1.12	.42	1.25	.51	1.56	.67	1.63	.89	1.89	1.18	1.78	1.45
1916.....	.76	.25	1.00	.36	1.05	.43	1.31	.62	1.49	.72	1.87	1.13	2.11	1.16
1917.....	.79	.40	.85	.44	.96	.56	1.11	.68	1.19	.95	1.25	1.31	1.31	1.37

TABLE No. 13.—*Contract prices for materials for 15 years.*

Year.	Cement per barrel.	Sand per cubic yard.	Gravel per cubic yard.	Terra-cotta pipe, linear foot.						
				8-inch.	10-inch.	12-inch.	15-inch.	18-inch.	21-inch.	24-inch.
1903.	\$1.96	\$0.55	\$0.87	\$0.12	\$0.185	\$0.235	\$0.33	\$0.42	\$0.62	\$0.80
1904.	1.75	.85	.85	.12	.228	.297	.401	.5049	.7425	.965
1905.	1.13	.81	.85	.14	.20	.29	.40	.50	.74	.96
1906.	1.35	.85	1.05	.122	.1647	.2236	.2997	.3672	.5454	.726
1907.	1.35	.74	.97	.153	.195	.261	.353	.443	.5454	.818
1908.	1.52	.84	1.04	.155	.225	.30	.405	.51	.75	.953
1909.	1.20	.55	.75	.155	.1707	.239	.3233	.4066	.5975	.7775
1910.	.975	.54	.65	.125	.15	.20	.27	.3825	.5625	.73125
1911.	.99	.395	.485	.115	.175	.22	.30	.42	.55	.715
1912.	.98	.345	.435	.121	.176	.22	.31	.40	.59	.715
1913.	.94	.345	.435	.105	.15	.18	.351	.494	.78	.847
1914.	1.11	.54	.69	.11	.256	.25	.432	.608	.96	1.04
1915.	1.04	.54	.69	.11	.23	.245	.43	.60	.96	1.04
1916.	1.09	.54	.69	.11	.16	.21	.284	.40	.63	.6825
1917.	1.33	.59	.74	.15	.23	.28	.39	.551	.90	.975

TABLE No. 14.—*Maintenance work, sewerage system, for 10 years.*

	1917	1916	1915	1914	1913
Main sewers, cleaned.....feet.	5,467	3,743	4,885	1,113	4,325
Pipe sewers, cleaned.....do.	189,796	156,733	156,773	145,767	123,545
Pipe sewers, flushed.....do.	5,983,209	6,949,719	6,077,129	6,339,122	6,705,367
Manholes flushed.....	15,597	17,611	15,473	17,208	18,594
Sumps, regulators, gates cleaned and in-spected.....	3,662	2,102	3,618	4,222	3,349
Basins flushed.....	17,938	15,793	15,242	18,586	18,416
Basins cleaned.....	39,256	45,514	51,201	45,502	40,241
Sludge removed:					
Pipe sewers.....cubic feet..	5,837	5,220	4,499	4,079	3,723
Basins.....do.	191,288	198,128	191,928	160,660	168,096
Sediment chamber.....do.	75,195	71,500	71,100	62,856	66,744
Screens.....pounds.	884,755	804,806	708,388	708,606	869,640
Main sewer inspected.....miles..	142.93	139.53	137.36	134.00	130.90
Pipe sewer inspected.....do.	1,133.00	1,316.00	1,150.00	1,200.00	1,270.00
Basins repaired.....	178	148	163	124	117
	1912	1911	1910	1909	1908
Main sewers cleaned.....feet..	4,071	300	1,185	11,624	13,723
Pipe sewers cleaned.....do.	122,838	161,190	149,626	133,145	81,914
Pipe sewers flushed.....do.	5,906,405	5,685,423	3,717,332	1,733,142	1,715,200
Manholes flushed.....	16,733	15,994	11,943	5,235	5,093
Sumps, regulators, gates cleaned and in-spected.....	2,245	530	568	11	8
Basins flushed.....	5,293	11,950	18,884	2,820	.....
Basins cleaned.....	38,760	60,379	57,733	52,634	40,806
Sludge removed:					
Pipe sewers.....cubic feet..	2,479	3,538	5,052	3,334	3,256
Basins.....do.	145,741	166,428	190,204	188,460	277,319
Sediment chamber.....do.	53,140	58,131	58,577	61,695	30,000
Screens.....pounds.	1,084,128	833,617	890,230	16,394	.....
Main sewers inspected.....miles..	126.24	122.78	114.00	114.00	.....
Pipe sewers inspected.....do.	491.47	469.42	448.78	346.00	340.00
Basins repaired.....	141	155	249	123	88

TABLE NO. 15.—*Summary of sewerage system for 25 years.*

Fiscal year.	Total length.			Total cost.		Annual cost maintenance and operation.	
	Trunk sewers.	Pipe sewers.	All sewers.	Sewerage system. <sup>1</sup>	Sewage disposal system.	Sewerage system.	Sewage disposal system. <sup>2</sup>
1893	68.37	238.45	306.82	\$8,007,721.62		\$43,000.00	
1894	71.32	250.13	321.45	8,298,931.62		45,000.00	
1895	74.48	260.20	334.68	8,476,431.62		45,000.00	
1896	77.65	270.28	347.93	8,661,731.62		45,000.00	
1897	81.36	284.06	365.42	8,901,731.62		45,000.00	
1898	83.92	298.91	382.93	9,047,731.62		50,000.00	
1899	85.65	307.36	393.01	9,183,731.62		50,000.00	
1900	88.30	317.20	405.50	9,309,731.62		50,000.00	
1901	90.89	327.86	418.75	9,515,731.62		50,000.00	
1902	93.49	338.13	431.62	9,696,731.62		58,000.00	
1903	96.31	351.73	448.04	9,817,731.62		58,000.00	
1904	99.12	357.70	456.82	9,940,731.62		58,000.00	
1905	103.21	365.60	468.81	10,040,881.62		58,000.00	
1906	109.09	375.26	484.35	10,128,881.62		42,000.00	
1907	112.20	389.24	501.44	10,363,881.62	\$3,714,823.00	38,000.00	<sup>3</sup> \$37,295.00
1908	113.94	407.24	521.18	10,536,681.62	3,952,768.65	44,500.00	<sup>3</sup> 38,625.00
1909	117.24	424.02	541.26	10,688,681.62	4,031,888.27	45,000.00	58,000.00
1910	119.20	448.78	567.98	10,860,556.62	4,095,630.70	48,500.00	58,000.00
1911	122.78	469.42	592.20	11,204,188.79	4,146,228.01	50,000.00	58,000.00
1912	126.01	492.52	618.53	11,539,374.28	4,228,555.94	50,000.00	59,500.00
1913	130.90	513.38	644.28	11,922,177.04	4,306,524.43	50,000.00	59,500.00
1914	133.50	527.99	661.49	12,470,940.74	4,495,830.13	50,500.00	62,000.00
1915	137.36	544.75	682.11	13,032,082.86	4,624,186.31	50,500.00	64,000.00
1916	139.53	562.53	702.06	13,294,095.25	4,671,279.19	50,000.00	64,500.00
1917	142.93	574.44	717.37	13,569,830.21	4,685,165.71	50,000.00	64,500.00

<sup>1</sup> Exclusive of sewage disposal system.<sup>2</sup> The sewage disposal system went into operation July 1, 1906.<sup>3</sup> Handling a part of the sewage only during these years.TABLE NO. 16.—*Rights of way acquired for sewer extensions, fiscal year 1917.*

For combined system trunk sewer (Macomb Street trunk) in line of Reno Road, extended, between Macomb and Newark Streets; through parcel 42/104.<sup>1,2</sup>

For separate system outlet sewer (Luzon Avenue trunk) from Georgia Avenue to Ninth Street; through parcel 103/18.<sup>2</sup>

For combined system Mount Pleasant trunk sewer from Park Road to Thirteenth Street; through lot 45, square 2843.<sup>3</sup>

For combined system Potomac Street trunk sewer from Potomac River to Water Street; through lot 28, square 1176.<sup>3</sup>

For separate system service sewer (Broad Branch trunk) in Linnean Avenue, extended, between Military Road and Ellicott Street; through parcel 59/9.<sup>2</sup>

For separate system service sewer (Broad Branch trunk) in Linnean Avenue, extended, between Military Road and Ellicott Street; through parcel 46/42.<sup>2</sup>

For separate system service sewer (Broad Branch trunk) in Linnean Avenue, extended, between Military Road and Ellicott Street; through parcel 59/10.<sup>2</sup>

For combined system Scagg's Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Anacostia Road; through parcel 168/1.<sup>3</sup>

For separate system service sewer (Broad Branch trunk) in line of Quesada Street, extended, between Thirty-second and Thirty-third Streets; through lot 9, square 2021.<sup>2</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 816, square 5861.<sup>3</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 65, square 5861.<sup>3</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 66, square 5861.<sup>3</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 18, square 5862.<sup>3</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lots 845 and 819, square 5862.<sup>3</sup>

<sup>1</sup> Acquired in fiscal year 1916.<sup>2</sup> Voluntary dedication.<sup>3</sup> Consideration paid.

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 69, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 820, square 5862.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lots 67 and 68, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 854, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 19, square 5862.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 71, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 70, square 5861.<sup>1</sup>

TABLE NO. 17.—*Electric conduits laid July 1, 1916, to July 1, 1917.*

Number of duets.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Western Union Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
1.....	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....	4,200	4,200	1,562	1,562			298	298	6,060	6,060
2.....	4,634	9,268	17,943	35,886					22,577	45,154
3.....			94	282					94	282
4.....	21,207	84,828	6,526	26,104			57	228	27,790	111,160
6.....	16	96	3,523	21,138					3,539	21,234
8.....	768	6,144	1,702	13,616	90	720			2,560	20,480
10.....			824	8,240					824	8,240
12.....	358	4,296							358	4,296
16.....	143	2,288							143	2,288
20.....	168	3,360							168	3,360
24.....			471	11,304					471	11,304
28.....	53	1,484							53	1,484
32.....					52	1,664			52	1,664
Total.....	31,547	115,964	32,645	118,132	142	2,384	355	526	64,681	237,006

TABLE NO. 18.—*Electric conduits; lengths laid by sizes to July 1, 1917.*

	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
1.....	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1.....	82,475	82,475	55,327	55,327				
2.....	158,844	317,688	314,861	629,722	15,742	31,484	13	26
3.....	236	708	5,926	17,778				
4.....	506,694	2,026,776	186,575	746,300	22,681	90,724	33,414	133,656
5.....								
6.....	46,116	276,696	99,438	596,628	8,173	49,038	5,117	30,702
7.....			82	574	29	203		
8.....	97,188	777,504	53,944	431,552	15,304	122,332	19,086	152,688
9.....	9,325	65,925	114	1,026				
10.....	121	1,210	23,187	231,870	32	320	8,275	82,750
12.....	51,194	614,328	11,336	136,032	908	10,896	11,458	137,496
13.....	374	4,862	212	2,756				
14.....	1,224	17,136	3,831	53,634	4,306	60,284	1,880	26,320
15.....	68	1,020			28	420		
16.....	514	82,256	8,036	128,576	479	7,664		
17.....			636	10,812				
18.....			4,149	74,682				
20.....	730	14,600	1,407	28,140	1,362	27,240	2,214	39,852
22.....			823	18,106	9,109	200,398	134	2,948
24.....	3,176	76,224	2,741	65,784				
25.....			304	7,600				
26.....					280	7,280		

<sup>1</sup> Consideration paid.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 127

TABLE No. 18.—*Electric conduits; lengths laid by sizes to July 1, 1917—Continued.*

	Potomac Electric Power Co.		Chesapeake & Potowmack Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
28.....	2,227	62,356						
30.....	53	1,590	313	9,390				
32.....	77	2,464	485	15,520	1,002	32,064		
36.....	3,854	138,744	26	936	125	4,500		
38.....							193	7,334
40.....			1,589	63,560				
44.....	446	19,624						
56.....			749	41,944				
58.....	7	406						
64.....	106	6,784	176	11,264				
70.....			53	3,710				
72.....			118	8,496				
82.....			35	2,870				
Total.....	967,676	4,591,376	776,473	3,394,589	79,560	644,947	81,871	616,208
			Western Union Telegraph Co.		Postal Telegraph Cable Co.		Total.	
			Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
1.....			Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
2.....	515	515	13,831	13,831	152,148	152,148		
3.....	3,409	6,818	1,126	2,252	493,995	987,990		
4.....	6,975	20,925			13,137	39,411		
5.....	7,993	31,972	35,428	141,712	792,785	3,171,140		
6.....	4,177	20,885			4,177	20,885		
7.....	4,232	25,392	17,313	103,878	180,389	1,082,334		
8.....					111	777		
9.....				1,140	9,120	186,662	1,493,296	
10.....					7,439	66,951		
12.....	183	1,830		283	3,396	31,798	317,980	
13.....					75,179	902,148		
14.....	309	4,017				895	11,635	
15.....						11,241	157,374	
16.....	44	660				140	2,100	
17.....						13,656	218,496	
18.....						636	10,812	
20.....						6,383	114,534	
22.....						3,499	69,980	
24.....						10,066	221,452	
25.....						5,917	142,008	
26.....						304	7,600	
28.....						280	7,280	
30.....						2,314	64,792	
32.....						366	10,980	
36.....						1,564	50,048	
38.....						4,005	144,180	
40.....						193	7,334	
44.....						1,589	63,560	
56.....						446	19,624	
58.....						749	41,944	
64.....						7	406	
70.....						282	18,048	
72.....						53	3,710	
82.....						118	8,496	
Total.....			27,837	113,014	69,121	274,189	2,002,538	9,634,323

This table does not include 9,550.7 feet of United States Government conduit, 7,915 feet of United States Government pipe lines, 216 feet of Washington & Old Dominion Ry. Co. conduit, 879.5 feet of Washington Market Co. pipe lines, 645.6 feet of private conduit, and 457 feet of 7 by 8 feet subway, 110 feet of 7 by 8 feet subway, and 87.5 feet of 3 by 2.2 feet subway laid by the United States Government.

TABLE No. 19.—*Electric conduits; lengths laid each year to July 1, 1917.*

Fiscal year.	Potomac Electric Power Co.		Chesapeake & Potowmac Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
Laid prior to Mar. 27, 1900.....	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
1901.....	343,885	1,812,866	79,920	698,920	48,218	399,851	75,743	569,322
1902.....	16,387	65,952	876	4,690			88	704
1903.....	8,068	89,958						
1904.....	24,655	105,592	123,604	640,448				
1905.....	15,635	65,412	35,995	138,649				
1906.....	13,798	56,892	39,409	147,002			4,670	37,360
1907.....	50,057	287,311	80,433	278,683				
1908.....	38,053	252,741	75,110	281,405	5,285	29,652		
1909.....	39,705	154,940	58,005	228,725	23	92		
1910.....	58,607	235,224	45,919	172,768	11,769	90,660	859	6,644
1911.....	46,096	159,422	56,582	140,859	263	1,788	420	1,804
1912.....	56,029	240,518	44,822	297,752	913	6,318		
1913.....	63,841	336,353	19,966	45,697	9,417	58,548	42	168
1914.....	39,883	146,117	22,980	64,630	2,300	18,400		
1915.....	45,018	170,578	24,391	51,778			34	136
1916.....	35,488	130,400	19,059	48,938			15	60
1917.....	40,894	164,136	16,847	35,513	1,230	37,254		
	31,547	115,964	32,645	118,132	142	2,384		
Total.....	967,676	4,591,376	776,473	3,394,589	79,560	644,947	81,871	616,208

Fiscal year.	Western Union Telegraph Co.		Postal Telegraph Cable Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
Laid prior to Mar. 27, 1900.....	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
1901.....			14,663	18,944	562,429	3,500,913
1902.....					17,351	71,346
1903.....						89,985
1904.....						148,259
1905.....						746,040
1906.....	10,635	44,995				51,540
1907.....	383	1,710				204,061
1908.....	11,463	51,775				57,877
1909.....	2,322	7,515				211,254
1910.....	329	652				610,989
1911.....			531	531	141,125	118,831
1912.....			50,238	232,992	102,295	505,508
1913.....			2,915	15,704	143,504	435,532
1914.....	607	1,214			68,078	512,811
1915.....	763	1,474		410	70,050	304,525
1916.....	980	3,153		364	55,726	223,706
1917.....	355	526			64,689	183,272
Total.....	27,837	113,014	69,121	274,189	2,002,538	9,634,323

TABLE No. 20.—*Gas mains; lengths laid, by sizes, July 1, 1916, to July 1, 1917.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
2-inch.....		<i>Linear feet.</i>	<i>Linear feet.</i>
2½-inch.....	1,133	1,133	1,133
4-inch.....		620	620
6-inch.....	12,882	2,558	15,440
12-inch.....	5,120	2,686	7,806
24-inch.....	290		290
30-inch.....	207		207
Total.....	147	5,864	147
		19,779	25,643

This table does not include 328.3 feet of 2-inch steam pipe laid by the Washington Gas Light Co., or 1,218 feet of 4-inch, 686.5 feet of 6-inch, and 708 feet of 10-inch gas main adjusted to grade on streets about to be improved.

TABLE No. 21.—*Gas mains; lengths laid, by sizes, July 1, 1907, to July 1, 1917.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	Linear feet.	Linear feet.
1½-inch.	9,298	3,120	12,418
2-inch.	6,206	1,485	7,691
2½-inch.		620	620
3-inch.	5,798		5,798
4-inch.	214,296	42,874	257,170
6-inch.	238,814	59,286	298,100
8-inch.	13,796	32,688	46,484
10-inch.	5,365	4,107	9,472
12-inch.	74,209	35,420	109,629
16-inch.	3,959	234	4,293
20-inch.	10,312		10,312
24-inch.	9,778		9,778
30-inch.	459		459
Total.	592,290	179,834	772,124

TABLE No. 22.—*Gas mains; lengths laid, by years, July 1, 1907, to July 1, 1917.*

Fiscal year.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
	Linear feet.	Linear feet.	Linear feet.
1907	36,605	8,450	45,055
1908	61,642	10,777	81,419
1909	83,692	25,498	109,190
1910	69,237	2,202	71,439
1911	48,192	10,983	59,175
1912	88,583	50,178	138,761
1913	61,234	11,688	72,922
1914	48,475	5,839	54,313
1915	45,274	14,415	59,690
1916	29,577	24,940	45,517
1917	19,779	5,864	25,643
Total.	592,290	179,834	772,124

## REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, D. C., September 20, 1917.

SIR: I have the honor to forward herewith the eighth annual report of the office of the municipal architect for the fiscal year ended June 30, 1917.

During the year 11 buildings were under construction, as follows:

Building.	Appropriation available.	Cost.	Completed or to be completed.
New Central High School No. 173, Eleventh, Thirteenth, and Clifton Streets and Florida Avenue NW	June 26, 1912 July 1, 1913 July 21, 1914 Mar. 19, 1917		
Alterations and improvements:			
Glass partition to form assistant principal's room.		\$135.00	Dec. 6, 1917
Counter for book store.		95.00	Nov. 11, 1916
Work benches for arts and crafts.		145.00	Jan. 17, 1917
Weather stripping on windows and doors.		1,551.92	Nov. 21, 1916
Border lights over stage.		1,000.00	Mar. 29, 1917
Wire grille and door.		49.00	Feb. 8, 1917
Key ea' net.		58.25	Mar. 6, 1917
Replacing pressure-reducing valve in main steam line.		291.00	Apr. 9, 1917
7 I beams for scenery supports.		238.00	Sept. 26, 1916
2 pin-rail galleries for handling scenery.		774.10	Do.
28 guards for windows.		80.00	Sept. 13, 1916
120 guards for windows.		150.00	July 31, 1916
Dunbar High School No. 174, First Street, between N and O Streets NW	June 26, 1912 July 1, 1913 July 21, 1914		

Building.	Appropriation available.	Cost.	Completed or to be completed.
Alterations and improvements:			
Rezilite mastic floor for pool, locker, and shower rooms.....	\$220.00		Aug. 17, 1916
Outlets in rifle range.....	32.50		Mar. 19, 1917
Conduit and wiring from switchboard to dishwasher in kitchen.....	136.00		Nov. 9, 1916
Iron ladder for coal vault.....	39.10		Feb. 1, 1917
Sliding sash for shelving in rear of lunch room counter.....	86.60		Jan. 23, 1917
Wire guard panels for lunch room counter rail.....	30.00		Jan. 5, 1917
Window fly screens for austral sash in domestic science department.....	215.00		Apr. 21, 1917
Wire guards for windows of chemical laboratory.....	60.00		Feb. 2, 1917
Counter in business office.....	259.34		Jan. 27, 1917
Glazed partitions at entrance to boys' and girls' locker rooms to form anteroom or vesti'ule.....	290.00		Mar. 6, 1917
7 shower stalls, girls' pool dressing room.....	184.00		May 2, 1917
Panel backs and glass partitions separating lobby from assembly hall.....	332.00		Oct. 6, 1916
Wireless masts, targets and target backings.....	1,303.00		
Iron grilles for physical and laboratory windows.....	465.00		June 21, 1917
Clocks and bells.....	1,785.00		Nov. 8, 1916
Black'ard cards.....	1,593.60		Sept. 1, 1916
Fireproof partition for stairway, 2 circular stairways to stage, grilles for organ chamb'ers, 2 inclusions for spiral stairways and private boxes.....	8,900.00		Jan. 13, 1917
Filtering and sterilizing system for pool.....	3,445.00		Sept. 24, 1916
Conservatory.....	4,216.00		Apr. 23, 1917
Improvements to building: Wire glass inclosure, steps to stage, pipe supports for scenery, handrail for main entrance, inclosure organ motor and miscellaneous hardware.....	2,905.00		Aug. 4, 1917
Lighting fixtures for entire building.....	1,950.00		Dec. —, 1917
Wiring to receptacle for piano player from switch box.....	35.00		
100 dozen casement fasts.....	109.00		May 16, 1917
Pit for organ console.....	85.00		Sept. 14, 1916
Powell School No. 157, School Street, opposite Lamont Street NW.....	July 1, 1915	57,601.00	Dee. 11, 1916
Heating and ventilating.....		13,568.00	Nov. 15, 1916
Electrical work.....		700.00	Dec. 18, 1916
Pu'lic convenience station No. 4, Maryland Avenue, Fifteenth and H Streets NE.....	Mar. 3, 1915	5,000.00	July 15, 1917
Fish wharf and market, Water Street, between Eleventh and Twelfth Streets SW.....	do	115,914.44	Dee. 26, 1917
Central garage, D Street, between Thirteenth and Thirteen-and-a-half Streets NW.....	Sept. 1, 1916	13,896.12	Aug. 31, 1917
Eliza eth V. Brown School No. 113, Connecticut Avenue, between McKinley and Northampton Streets NW.....	do	68,635.00	Feb. 23, 1918
Sheds of the street cleaning department, between Thirteenth, Fourteenth, E and G Streets SE.....	do	5,960.00	Aug. 25, 1917
Greenhouse for James Ormond Wilson Normal School No. 162, Eleventh and Harvard Streets NW.....	do	2,000.00	Sept. —, 1917
Garage for health department pound and stable, South Capitol and I Streets SW.....	do	2,641.00	July 30, 1917
Farmers' Produce Market, third shelter, B Street, between Tenth and Twelfth Streets NW.....	do	13,632.00	Jan. 7, 1918

*Specifications and proposals for improvements.*

Building.	Work.	Date of advertisement.
Truck house No. 5.....	Electrical work.....	July 7, 1916
Wharf for fire boat.....	Replacing piles.....	July 12, 1916
Publie Library.....	Removal of stone grill.....	July 21, 1916
Dunbar High School.....	Blackboards.....	July 25, 1916
Do.....	Rezilite mastic floors.....	Do.
Park View School.....	Blackboards.....	Do.
Congress Heights School.....	Repair of tower clock.....	Do.
Dunbar High School.....	Lighting fixtures.....	July 28, 1916
Do.....	Stage and other curtains.....	Aug. 2, 1916
Do.....	Clocks and bells.....	Do.
Summer School.....	Retubing boilers.....	Do.
Central High No.43.....	Repairs to boilers.....	Do.
S. J. Bowen School.....	do.....	Do.
Police court.....	do.....	Do.
Seaton School No. 22.....	do.....	Do.
Brookland School.....	Electrical work.....	Aug. 3, 1916
District of Columbia Reformatory.....	Construction smokestack.....	Aug. 11, 1916

*Specifications and proposals for improvements—Continued.*

Building.	Work.	Date of advertisement.
Truck house No. 6.....	Electrical work.....	Aug. 12, 1916
New Central High School.....	Weather stripping.....	Aug. 16, 1916
Park View School.....	Lighting fixtures.....	Do.
New Central High School.....	Glass partitions, office assistant principal.....	Aug. 21, 1916
Truck house No. 6.....	Electrical work.....	Do.
New Central High School.....	Counter for storeroom.....	Do.
Dunbar High School.....	Alterations and improvements.....	Aug. 23, 1916
New Central High School.....	Window workbenches.....	Aug. 24, 1916
Do.....	Border lights over stage.....	Aug. —, 1916
Dunbar High School.....	Pit for organ console.....	Do.
Do.....	Panel backs and glass partitions separating lobby from assembly hall.....	Do.
Park View School.....	Bookcases for library.....	Do.
Portable school.....	Hauling from Park View site to site E. V. Brown School.....	Sept. 13, 1916
Do.....	Hauling from Corcoran site to site E. V. Brown School.....	Do.
Do.....	Hauling from Park View site to site Jos. R. West School.....	Do.
Do.....	Hauling from Park View site to site of Bryan School.....	Do.
Dunbar High School.....	Haulin from Phillips Schoolsite to site of Deanwood School.....	Do.
Western High School.....	Printing department equipment.....	Sept. 23, 1916
Dunbar High School.....	Papering assembly hall.....	Sept. —, 1916
Police station No. 1.....	Conduit and wiring from switchboard to dishwasher in kitchen.....	Oct. 13, 1916
Truck house No. 1.....	Electrical work.....	Do.
Dunbar High School.....	Drive-way.....	Oct. 19, 1916
Western High School.....	Wireless masts.....	Oct. 20, 1916
Dunbar High School.....	do.....	Do.
Do.....	Iron ladder from boiler room.....	Oct. 23, 1916
Engine house No. 28.....	Feed wire to receptacle for piano player.....	Oct. 24, 1916
Do.....	Flag pole.....	Oct. —, 1916
Business High School.....	Rollers for hose rack.....	Do.
New Central High School.....	Electrical work.....	Nov. 9, 1916
Convenience station No. 4.....	Replacing pressure-reducing valve, main steam line.....	Nov. 10, 1916
J. O. Wilson Normal School.....	Construction.....	Nov. 13, 1916
Police court.....	Motion-picture machine and booth equipment.....	Nov. 18, 1916
Dunbar High School.....	Hardwool floors.....	Nov. 22, 1916
Do.....	Window screens for austral sash.....	Do.
Do.....	Wire-guarl panels for lunch-room counter rail.....	Do.
Engine house No. 28.....	Sliding sash for upper shelving, lunch-room counter.....	Do.
Repairs to school.....	Pipe railing.....	Do.
Dunbar High School.....	Furnaces and stack heaters.....	Do.
Do.....	Shower stalls.....	Dec. —, 1916
Do.....	Counter in business office.....	Do.
Do.....	24 wire window guarls, chemical laboratory.....	Dec. 1, 1916
Do.....	Outlets in rifle range.....	Dec. —, 1916
J. O. Wilson Normal School.....	Construction of conservatory.....	Dec. 12, 1916
Dunbar High School.....	do.....	Do.
Central High School.....	Iron grilles.....	Dec. —, 1916
Dunbar High School.....	Wire grille and door.....	Do.
Engine house No. 28.....	Shower stall dressing inclosures.....	Do.
Dunbar High School.....	Electrical work.....	Dec. 13, 1916
School buildings.....	Glaze partition, entrance boys and girls' locker rooms.....	Dec. —, 1916
Dunbar High School.....	Water-closet combinations.....	Dec. 15, 1916
Simmons, Douglass, and M Street High Schools.....	Dressing booths for girls' locker room.....	Dec. 19, 1916
Dunbar High School.....	Radiator valves.....	Do.
New Central High School.....	Filtering and sterilizing system.....	Dec. 21, 1916
Powell School.....	Key cabinet.....	Dec. —, 1916
Truck house No. 3.....	Rezilite treads on old stairway.....	Do.
Engine house No. 2.....	New sections in boiler.....	Do.
Convenience station No. 4.....	Electrical work.....	Dec. 26, 1916
Park View School.....	Stale an' nickel work.....	Jan. —, 1917
Central Garage.....	82 Wire guards.....	Feb. 3, 1917
Public Convenience station No. 4.....	Construction.....	Feb. 5, 1917
Dunbar High School.....	Electric lighting system.....	Feb. 6, 1917
Do.....	Extra shades for stage.....	Feb. 8, 1917
District of Columbia Reformatory.....	Stage box curtains.....	Do.
Peabody School No. 31.....	Equipment for bakery.....	Feb. 13, 1917
Ludlow School No. 142.....	Safety stair treads.....	Feb. 19, 1917
Washington Asylum Hospital.....	Fence, gate, and concrete curb.....	Do.
District repair shop.....	Repair to boiler.....	Mar. 2, 1917
Ludlow School No. 142.....	Steel beams.....	Mar. 6, 1917
Peabody School No. 31.....	Fence, gate, and concrete curb.....	Do.
Fish wharf and market.....	Safety stair treads.....	Do.
Do.....	Purchase of lumber for sheds.....	Mar. 8, 1917
Johnson School.....	Construction.....	Mar. 12, 1917
No. 6 police station.....	do.....	Mar. 13, 1917
Engine house No. 6.....	Heating system.....	Do.
Engine house No. 7.....	do.....	Do.
Engine house No. 26.....	do.....	Do.

## 126 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 69, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 820, square 5862.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lots 67 and 68, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 854, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 19, square 5862.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 71, square 5861.<sup>1</sup>

For combined system Stickfoot Branch trunk sewer, between Alexandria Branch, Baltimore & Ohio Railroad, and Nichols Avenue; through lot 70, square 5861.<sup>1</sup>

TABLE NO. 17.—*Electric conduits laid July 1, 1916, to July 1, 1917.*

Number of duets.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Western Union Telegraph Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
1.....	4,200	4,200	1,562	1,562			298	298	6,060	6,060
2.....	4,634	9,268	17,943	35,886					22,577	45,154
3.....			94	282					94	282
4.....	21,207	84,828	6,526	26,104			57	228	27,790	111,160
6.....	16	96	3,523	21,138					3,539	21,234
8.....	768	6,144	1,702	13,616	90	720			2,560	20,480
10.....			824	8,240					824	8,240
12.....	358	4,296							358	4,296
16.....	143	2,288							143	2,288
20.....	168	3,360							168	3,360
24.....			471	11,304					471	11,304
28.....	53	1,484							53	1,484
32.....					52	1,664			52	1,664
Total.....	31,547	115,964	32,645	118,132	142	2,384	355	526	64,681	237,006

TABLE NO. 18.—*Electric conduits; lengths laid by sizes to July 1, 1917.*

	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
1.....	82,475	82,475	55,327	55,327				
2.....	158,844	317,688	314,861	629,722	15,742	31,484	13	26
3.....	236	708	5,926	17,778				
4.....	506,694	2,026,776	186,575	746,300	22,681	90,724	33,414	133,656
5.....								
6.....	46,116	276,696	99,438	506,628	8,173	49,038	5,117	30,702
7.....			82	574	29	203		
8.....	97,188	777,504	53,944	431,552	15,304	122,432	19,086	152,688
9.....	9,325	65,925	114	1,026				
10.....	121	1,210	23,187	231,870	32	320	8,275	82,750
12.....	51,194	614,328	11,336	136,032	908	10,896	11,458	137,496
13.....	374	4,862	212	2,756				
14.....	1,224	11,136	3,831	53,634	4,306	60,284	1,880	26,320
15.....	68	1,020			28	420		
16.....	514	82,256	8,036	128,576	479	7,664		
17.....			636	10,812				
18.....			4,149	74,682			2,214	39,832
20.....	730	14,600	1,407	28,140	1,362	27,240		
22.....				823	18,106	9,109	200,398	134
24.....	3,176	76,224	2,741	65,784				
25.....			304	7,600				
26.....					280	7,280		

1 Consideration paid.

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 127

TABLE No. 18.—*Electric conduits; lengths laid by sizes to July 1, 1917—Continued.*

	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
28.....	2,227	62,356	313	9,390	1,002	32,064	87	2,436
30.....	53	1,590	485	15,520	125	4,500	.....	.....
32.....	77	2,464	936	.....	.....	.....	.....	.....
36.....	3,854	138,744	.....	.....	.....	.....	193	7,334
38.....	.....	.....	1,589	63,560	.....	.....	.....	.....
40.....	446	19,624	749	41,944	.....	.....	.....	.....
44.....	.....	.....	.....	.....	.....	.....	.....	.....
56.....	7	406	.....	.....	.....	.....	.....	.....
58.....	106	6,784	176	11,264	53	3,710	.....	.....
64.....	.....	.....	.....	.....	118	8,496	.....	.....
70.....	.....	.....	.....	.....	35	2,870	.....	.....
72.....	.....	.....	.....	.....	.....	.....	.....	.....
82.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	967,676	4,591,376	776,473	3,394,589	79,560	644,947	81,871	616,208
.....		Western Union Telegraph Co.		Postal Telegraph Cable Co.		Total.		
		Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	
		Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	
1.....	.....	515	515	13,831	13,831	152,148	152,148	.....
2.....	.....	3,409	6,818	1,126	2,252	493,995	987,990	.....
3.....	.....	6,975	20,925	.....	.....	13,137	39,411	.....
4.....	.....	7,993	31,972	35,428	141,712	792,785	3,171,140	.....
5.....	.....	4,177	20,885	.....	.....	4,177	20,885	.....
6.....	.....	4,232	25,392	17,313	103,878	180,389	1,082,334	.....
7.....	.....	.....	.....	.....	.....	111	777	.....
8.....	.....	.....	.....	1,140	9,120	186,662	1,493,296	.....
9.....	.....	.....	.....	.....	.....	7,439	66,951	.....
10.....	.....	183	1,830	.....	.....	31,798	317,980	.....
12.....	.....	.....	.....	283	3,396	75,179	902,148	.....
13.....	.....	309	4,017	.....	.....	595	11,635	.....
14.....	.....	.....	.....	.....	.....	11,241	157,374	.....
15.....	.....	44	660	.....	.....	140	2,100	.....
16.....	.....	.....	.....	.....	.....	13,656	218,496	.....
17.....	.....	.....	.....	.....	.....	636	10,812	.....
18.....	.....	.....	.....	.....	.....	8,363	114,534	.....
20.....	.....	.....	.....	.....	.....	3,499	69,990	.....
22.....	.....	.....	.....	.....	.....	10,066	221,452	.....
24.....	.....	.....	.....	.....	.....	5,917	142,008	.....
25.....	.....	.....	.....	.....	.....	304	7,600	.....
26.....	.....	.....	.....	.....	.....	280	7,280	.....
28.....	.....	.....	.....	.....	.....	2,314	64,792	.....
30.....	.....	.....	.....	.....	.....	366	10,980	.....
32.....	.....	.....	.....	.....	.....	1,564	50,048	.....
36.....	.....	.....	.....	.....	.....	4,005	144,180	.....
38.....	.....	.....	.....	.....	.....	193	7,334	.....
40.....	.....	.....	.....	.....	.....	1,589	63,560	.....
44.....	.....	.....	.....	.....	.....	446	19,624	.....
56.....	.....	.....	.....	.....	.....	749	41,944	.....
58.....	.....	.....	.....	.....	.....	7	406	.....
64.....	.....	.....	.....	.....	.....	282	18,048	.....
70.....	.....	.....	.....	.....	.....	53	3,710	.....
72.....	.....	.....	.....	.....	.....	118	8,496	.....
82.....	.....	.....	.....	.....	.....	35	2,870	.....
Total.....	.....	27,837	113,014	69,121	274,189	2,002,538	9,634,323	.....

This table does not include 9,550.7 feet of United States Government conduit, 7,915 feet of United States Government pipe lines, 216 feet of Washington & Old Dominion Ry. Co. conduit, 879.5 feet of Washington Market Co. pipe lines, 645.6 feet of private conduit, and 457 feet of 7 by 8 feet subway, 110 feet of 7 by 1 feet subway, and 87.5 feet of 3 by 2.2 feet subway laid by the United States Government.

TABLE No. 19.—*Electric conduits; lengths laid each year to July 1, 1917.*

Fiscal year.	Potomac Electric Power Co.		Chesapeake & Potomac Telephone Co.		Capital Traction Co.		Washington Ry. & Electric Co.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
Laid prior to Mar. 27, 1900.....	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1901.....	343,885	1,513,566	79,920	698,920	48,218	399,851	75,743	569,332
1902.....	16,387	65,952	876	4,690			88	704
1903.....	8,098	89,958						
1904.....	24,655	105,592	123,604	640,448				
1905.....	15,635	65,412	35,905	138,649				
1906.....	13,798	56,892	39,409	147,002				
1907.....	50,057	287,311	80,433	278,683				
1908.....	38,053	252,741	75,110	281,405	5,285	29,652		
1909.....	39,705	154,940	58,005	228,725	23	92		
1910.....	58,607	235,224	45,919	172,768	11,769	90,660	859	6,644
1911.....	46,096	159,422	56,582	140,859	263	1,788	420	1,804
1912.....	56,029	240,518	44,822	297,752	913	6,318		
1913.....	63,841	336,353	19,966	45,697	9,417	58,548	42	163
1914.....	39,883	146,117	22,980	64,630	2,300	18,400		
1915.....	45,018	170,578	24,391	51,778			34	136
1916.....	35,488	130,400	19,059	48,938				
1917.....	40,894	164,136	16,847	35,513	1,230	37,254	15	60
Total.....	967,676	4,591,376	776,473	3,394,589	79,560	644,947	81,871	616,208

Fiscal year.	Western Union Telegraph Co.		Postal Telegraph Cable Co.		Total.	
	Conduit.	Duct.	Conduit.	Duct.	Conduit.	Duct.
Laid prior to Mar. 27, 1900.....	Feet.	Feet.	Feet.	Feet.	Feet.	Feet.
1901.....			14,663	18,944	562,429	3,500,913
1902.....					17,351	71,346
1903.....					8,098	89,958
1904.....					148,259	746,049
1905.....					51,540	204,061
1906.....	10,635	44,995			57,877	241,254
1907.....	383	1,710			111,125	610,989
1908.....	11,463	51,775			118,831	565,508
1909.....	2,322	7,515			109,196	435,532
1910.....	329	652			119,476	512,811
1911.....			531	531	103,960	304,525
1912.....			50,238	232,992	102,295	545,119
1913.....			2,915	15,704	143,504	673,758
1914.....	607	1,214			68,078	244,851
1915.....	763	1,474	410	2,460	70,050	223,706
1916.....	980	3,153	364	3,558	55,720	183,272
1917.....	355	526			60,330	243,674
Total.....	27,837	113,014	69,121	274,189	2,002,538	9,634,323

TABLE No. 20.—*Gas mains; lengths laid, by sizes, July 1, 1916, to July 1, 1917.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
2-inch.....	Linear feet.	Linear feet.	Linear feet.
24-inch.....	1,133	620	1,133
4-inch.....			620
6-inch.....	12,882	2,558	15,440
12-inch.....	5,120	2,686	7,806
24-inch.....	290		290
30-inch.....	207		207
Total.....	147		147
Total.....	19,779	5,864	25,643

This table does not include 328.3 feet of 2-inch steam pipe laid by the Washington Gas Light Co., or 1,218 feet of 4-inch, 686.5 feet of 6-inch, and 708 feet of 10-inch gas main adjusted to grade on streets about to be improved.

TABLE NO. 21.—*Gas mains; lengths laid, by sizes, July 1, 1907, to July 1, 1917.*

Size of mains.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
1½-inch.			
2-inch.	9,298	3,120	12,418
2½-inch.	6,206	1,485	7,691
3-inch.		620	620
4-inch.	5,798		5,798
6-inch.	214,296	42,874	257,170
8-inch.	238,814	59,286	298,100
10-inch.	13,796	32,688	46,484
12-inch.	5,365	4,107	9,472
16-inch.	74,209	35,420	109,629
20-inch.	3,959	234	4,293
24-inch.	10,312		10,312
30-inch.	9,778		9,778
	450		450
Total.	592,290	179,834	772,124

TABLE NO. 22.—*Gas mains; lengths laid, by years, July 1, 1907, to July 1, 1917.*

Fiscal year.	Washington Gas Light Co.	Georgetown Gas Light Co.	Total.
1907.			
1908.	36,605	8,450	45,055
1909.	61,642	10,777	81,419
1910.	83,692	25,498	109,190
1911.	69,237	2,202	71,439
1912.	48,192	10,983	59,175
1913.	88,583	50,178	138,761
1914.	61,234	11,688	72,922
1915.	48,475	5,839	54,313
1916.	45,274	14,415	59,690
1917.	29,577	24,940	45,517
	19,779	5,864	25,643
Total.	592,290	179,834	772,124

## REPORT OF THE MUNICIPAL ARCHITECT.

WASHINGTON, D. C., September 20, 1917.

SIR: I have the honor to forward herewith the eighth annual report of the office of the municipal architect for the fiscal year ended June 30, 1917.

During the year 11 buildings were under construction, as follows:

Building.	Appropriation available.	Cost.	Completed or to be completed.
New Central High School No. 173, Eleventh, Thirteenth, and Clifton Streets and Florida Avenue NW.	June 26, 1912 July 1, 1913 July 21, 1914 Mar. 19, 1917	.....	
Alterations and improvements:			
Glass partition to form assistant principal's room.		\$135.00	Dec. 6, 1917
Counter for book store.		95.00	Nov. 11, 1916
Work benches for arts and crafts.		145.00	Jan. 17, 1917
Weather stripping on windows and doors.		1,551.92	Nov. 21, 1916
Border lights over stage.		1,000.00	Mar. 29, 1917
Wire grille and door.		49.00	Feb. 8, 1917
Key en' net.		58.25	Mar. 6, 1917
Replacing pressure-reducing valve in main steam line.		291.00	Apr. 9, 1917
7 I beams for scenery supports.		238.00	Sept. 26, 1916
2 pin-rail galleries for handling scenery.		774.10	Do.
28 guards for windows.		80.00	Sept. 13, 1916
120 guards for windows.		150.00	July 31, 1916
Dunbar High School No. 174, First Street, between N and O Streets NW.	June 26, 1912 July 1, 1913 July 21, 1914	.....	

Building.	Appropriation available.	Cost.	Completed or to be completed.
Alterations and improvements:			
Resilite mastic floor for pool, locker, and shower rooms.....	\$220.00		Aug. 17, 1916
Outlets in rifle range.....	32.50		Mar. 19, 1917
Conduit and wiring from switchboard to dishwasher in kitchen.....	136.00		Nov. 9, 1916
Iron ladder for coal vault.....	39.10		Feb. 7, 1917
Sliding sash for shelving in rear of lunch room counter.....	86.60		Jan. 25, 1917
Wire guard panels for lunch room counter rail.....	30.00		Jan. 5, 1917
Window fly screens for austral sash in domestic science department.....	215.00		Apr. 24, 1917
Wire guards for windows of chemical laboratory.....	60.00		Feb. 2, 1917
Counter in business office.....	259.34		Jan. 27, 1917
Glazed partitions at entrance to boys' and girls' locker rooms to partition anteroom or vestibule.....	290.00		Mar. 6, 1917
7 shower stalls, girls' pool dressing room.....	184.00		May 2, 1917
Panel backs and glass partitions separating lobby from assembly hall.....	332.00		Oct. 6, 1916
Wireless masts, targets and target backings.....	1,303.00		
Iron grilles for physical and laboratory windows.....	465.00		June 21, 1917
Clocks and bells.....	1,785.00		Nov. 8, 1916
Blackout cords.....	1,593.60		Sept. 1, 1916
Fireproof partition for stairway, 2 circular stairways to stage, grilles for organ chamber, 2 inclosures for spiral stairways and private boxes.....	8,900.00		Jan. 13, 1917
Filtering and sterilizing system for pool.....	3,445.00		Sept. 24, 1916
Conservatory.....	4,216.00		Apr. 23, 1917
Improvements to building: Wire glass inclosure, steps to stage, pipe supports for scenery, handrail for main entrance, inclosure organ motor and miscellaneous hardware.....	2,905.00		Aug. 4, 1917
Lighting fixtures for entire building.....	1,950.00		Dec. —, 1917
Wiring to receptacle for piano player from switch box.....	35.00		
100 dozen easement fasts.....	109.00		May 16, 1917
Pit for organ console.....	85.00		Sept. 14, 1916
Powell School No. 157, School Street, opposite Lamont Street NW.....	July 1, 1915	57,601.00	Dec. 11, 1916
Heating and ventilating.....		13,568.00	Nov. 15, 1916
Electrical work.....		700.00	Dec. 18, 1916
Public convenience station No. 4, Maryland Avenue, Fifteenth and H Streets NE.....	Mar. 3, 1915	5,000.00	July 15, 1917
Fish wharf and market, Water Street, between Eleventh and Twelfth Streets SW.....	do	115,914.44	Dec. 26, 1917
Central garage, D Street, between Thirteenth and Thirteen-and-a-half Streets N.W.....	Sept. 1, 1916	13,896.12	Aug. 31, 1917
Eliza'eth V. Brown School No. 113, Connecticut Avenue, between McKinley and Northampton Streets N.W.....	do	68,635.00	Feb. 23, 1918
Sheds of the street cleaning department, between Thirteenth, Fourteenth, E and G Streets SE.....	do	5,960.00	Aug. 25, 1917
Greenhouse for James Ormond Wilson Normal School No. 162, Eleventh and Harvard Streets NW.....	do	2,000.00	Sept. —, 1917
Garage for health department pound and stable, South Capitol and I Streets SW.....	do	2,611.00	July 30, 1917
Farmers' Produce Market, third shelter, B Street, between Tenth and Twelfth Streets NW.....	do	13,632.00	Jan. 7, 1918

*Specifications and proposals for improvements.*

Building.	Work.	Date of advertisement.
Truck house No. 5.....	Electrical work.....	July 7, 1916
Wharf for fire boat.....	Replacing piles.....	July 12, 1916
Public Library.....	Removal of stone grill.....	July 12, 1916
Dunbar High School.....	Blackboards.....	July —, 1916
Do.....	Resilite mastic floors.....	Do.
Park View School.....	Blackboards.....	Do.
Congress Heights School.....	Repair of tower clock.....	Do.
Dunbar High School.....	Lighting fixtures.....	July 28, 1916
Do.....	Stage and other curtains.....	Aug. 2, 1916
Sumner School.....	Clocks and bells.....	Do.
Central High No. 43.....	Retubing boilers.....	Do.
S. J. Bowen School.....	Repairs to boilers .....	Do.
Police court.....	do.....	Do.
Seaton School No. 22.....	do.....	Do.
Brookland School.....	Electrical work.....	Aug. 3, 1916
District of Columbia Reformatory.....	Construction smokestack.....	Aug. 11, 1916

*Specifications and proposals for improvements—Continued.*

Building.	Work.	Date of advertisement.
Truck house No. 6.....	Electrical work.....	Aug. 12, 1916
New Central High School.....	Weather stripping.....	Aug. 16, 1916
Park View School.....	Lighting fixtures.....	Do.
New Central High School.....	Glass partitions, office assistant principal.....	Aug. 21, 1916
Truck house No. 6.....	Electrical work.....	Do.
New Central High School.....	Counter for storeroom.....	Do.
Dunbar High School.....	Alterations and improvements.....	Aug. 23, 1916
New Central High School.....	Window workbenches.....	Aug. 24, 1916
Do.....	Border lights over stage.....	Aug. —, 1916
Dunbar High School.....	Pit for organ console.....	Do.
Do.....	Panel backs and glass partitions separating lobby from assembly hall.....	Do.
Park View School.....	Bookcases for library.....	Sept. 13, 1916
Portable school.....	Hauling from Park View site to site E. V. Brown School.....	Do.
Do.....	Hauling from Corcoran site to site E. V. Brown School.....	Do.
Do.....	Hauling from Park View site to site Jos. R. West School.....	Do.
Do.....	Hauling from Phillips Schoolsite to site of Deanwood School.....	Do.
Dunbar High School.....	Printing department equipment.....	Sept. 23, 1916
Western High School.....	Papering assembly hall.....	Sept. —, 1916
Dunbar High School.....	Conduit and wiring from switchboard to dishwasher in kitchen.....	Oct. 13, 1916
Police station No. 1.....	Electrical work.....	Do.
Truck house No. 1.....	Driveway.....	Oct. 19, 1916
Dunbar High School.....	Wireless masts.....	Oct. 20, 1916
Western High School.....	do.....	Do.
Dunbar High School.....	Iron ladder from boiler room.....	Oct. 23, 1916
Do.....	Feed wire to receptacle for piano player.....	Oct. 24, 1916
Engine house No. 28.....	Flag pole.....	Oct. —, 1916
Do.....	Rollers for hose rack.....	Do.
Business High School.....	Electrical work.....	Nov. 9, 1916
New Central High School.....	Replacing pressure-reducing valve, main steam line.....	Nov. 10, 1916
Convenience station No. 4.....	Construction.....	Nov. 13, 1916
J. O. Wilson Normal School.....	Motion-picture machine and booth equipment.....	Nov. 18, 1916
Police court.....	Hardwood floors.....	Nov. 22, 1916
Dunbar High School.....	Window screens for austral sash.....	Do.
Do.....	Wire-gauze panels for lunch-room counter rail.....	Do.
Do.....	Sliding sash for upper shelving, lunch-room counter.....	Do.
Repairs to school.....	Pipe railing.....	Do.
Dunbar High School.....	Furnaces an' stack heaters.....	Dec. —, 1916
Do.....	Showers stalls.....	Do.
Do.....	Counter in business office.....	Dec. 1, 1916
Do.....	24 wire window guards, chemical laboratory.....	Dec. —, 1916
Do.....	Outlets in rifle range.....	Dec. 12, 1916
J. O. Wilson Normal School.....	Construction of conservatory.....	Do.
Dunbar High School.....	do.....	Dec. —, 1916
Central High School.....	Iron grilles.....	Do.
Dunbar High School.....	Wire grille and door.....	Do.
Engine house No. 28.....	Showers stall dressing inclosures.....	Dec. 13, 1916
Dunbar High School.....	Electrical work.....	Dec. —, 1916
School buildings.....	Glaze partition, entrance boys and girls' locker rooms.....	Dec. 15, 1916
Dunbar High School.....	Water-closet combinations.....	Dec. 19, 1916
Simmons, Douglass, and M Street High Schools.....	Dressing booths for girls' locker room.....	Do.
Dunbar High School.....	Radiator valves.....	Dec. 21, 1916
New Central High School.....	Filtering and sterilizing system.....	Dec. —, 1916
Powell School.....	Key cabinet.....	Do.
Truck house No. 3.....	Rezilite treads on old stairway.....	Do.
Engine house No. 2.....	New sections in boiler.....	Dec. 26, 1916
Convenience station No. 4.....	Electrical work.....	Jan. —, 1917
Park View School.....	Steel an' nickel work.....	Feb. 3, 1917
Central Garage.....	82 Wire guards.....	Feb. 5, 1917
Public Convenience station No. 4.....	Construction.....	Feb. 6, 1917
Dunbar High School.....	Electric lighting system.....	Feb. 8, 1917
Do.....	Extra shades for stage.....	Do.
District of Columbia Reformatory.....	Stage box curtains.....	Feb. 13, 1917
Peabody School No. 31.....	Equipment for bakery.....	Feb. 19, 1917
Ludlow School No. 142.....	Safety stair treads.....	Do.
Washington Asylum Hospital.....	Fence, gate, and concrete curb.....	Mar. 2, 1917
District repair shop.....	Repair to boiler.....	Mar. 6, 1917
Ludlow School No. 142.....	Steel beams.....	Do.
Peabody School No. 31.....	Fence, gate, and concrete curb.....	Do.
Fish wharf and market.....	Safety stair treads.....	Mar. 8, 1917
Do.....	Purchase of lumber for sheds.....	Mar. 12, 1917
Johnson School.....	Construction.....	Mar. 13, 1917
No. 6 police station.....	Heating system.....	Do.
Engine house No. 6.....	do.....	Do.
Engine house No. 7.....	do.....	Do.
Engine house No. 26.....	do.....	Do.

*Specifications and proposals for improvements—Continued.*

Building.	Work.	Date of advertisement.
Briggs School .....	Wire fence .....	Mar. 13, 1917
Street-cleaning department .....	Sheds .....	Mar. 22, 1917
Health Department .....	Garage and pound .....	Mar. 21, 1917
New Central High School .....	Modification of boys' and girls' lockers .....	Mar. 26, 1917
Workhouse and reformatory .....	Radial brick stack .....	Apr. 2, 1917
Do .....	Water-tube boilers and breeching .....	Do.
Do .....	Boiler feed pumps and feed-water heater .....	Do.
Portable school .....	Hauling from site of Payne School to site of Lovejoy School .....	Apr. 5, 1917
E. V. Brown School .....	Construction of addition .....	Apr. 6, 1917
Do .....	Heating and ventilating system .....	Do.
J. O. Wilson Normal .....	Heating system for greenhouse .....	Do.
Dunbar High School .....	Additional work and improvements .....	Apr. 11, 1917
District of Columbia repair shop .....	Slag roof, shed in rear .....	Apr. 12, 1917
Workhouse .....	Refrigerating equipment .....	Apr. 13, 1917
District of Columbia repair shop .....	Cast-iron spiral stairway .....	Apr. 16, 1917
New Central High School .....	Forge-shop equipment .....	Apr. 25, 1917
Cardozo playground .....	Swimming pool .....	Apr. 30, 1917
Piney Branch Parkway playground .....	do .....	Do.
Public Library .....	Removal of stone grilles .....	May 5, 1917
Do .....	Erection shelving and music rack .....	May 8, 1917
Farmers' market .....	Constructing third shelter .....	May 9, 1917
Police court .....	Hardwood floors .....	May 11, 1917
Burrville School .....	Construction of addition .....	May 14, 1917
Benning School .....	Construction of addition for toilet facilities .....	May 15, 1917
New Central High School .....	Modification northwest terrace, locker room, dressing and toilet rooms, etc .....	May 18, 1917
Smallpox Hospital .....	Incinerator .....	May 19, 1917
Convenience station No. 3 .....	Stair treads .....	May 23, 1917
Police station No. 2 .....	Alterations and cell work .....	June 1, 1917
Home for Aged and Infirmary .....	Construction colored women's ward .....	Do.
Convenience station No. 3 .....	Stair treads .....	June 11, 1917
Convenience station No. 1 .....	Painting .....	June 12, 1917
Public Crematorium .....	Alterations and repairs .....	June 19, 1917
New Central High School .....	Filtering and sterilizing system .....	June 23, 1917
District of Columbia Reformatory .....	Ice plant .....	Do.
New Central High School .....	Motor generator .....	June 23, 1917
Convenience station No. 3 .....	Water-proofing, vault lights, etc .....	June 26, 1917
Convenience station No. 4 .....	Lighting fixtures .....	June — 1917
Repairs to school furnaces .....		Do.

## CUBIC COST OF BUILDINGS.

In the annual reports of previous years tables have been submitted showing the cubic cost of buildings erected since 1896. The following table shows cost of buildings erected last year and some now under construction. Where the cubic cost is a fair unit for comparison the advance in cost over 1898 figures is about 75 per cent.

Comparison in cost of Washington school buildings and repairs with cost in other cities for buildings of similar materials and construction, shows most favorably for our school buildings.

Building.	Cost.	Cubic contents.	Cost per cubic foot.	Heating system.
Public convenience station No. 4, Maryland Avenue, Fifteenth and H Streets NE.	\$5,000.00	8,686.9	\$0.5755	Gas, steam.
Fish wharf and market, Water Street between Eleventh and Twelfth Streets SW.	<sup>1</sup> 115,914.44	589.071	.1967	Gas.
Central Garage, D Street between Thirteenth and Thirteen-and-a-half Streets NW.	13,702.00	128,438	.106	Steam.
Elizabeth V. Brown School No. 113, Connecticut Avenue between McKinley and Northampton Streets NW.	<sup>2</sup> 68,635.00	507,111	.1353	Do.
Sheds for the street-cleaning department, between Thirteenth, Fourteenth, E and G Streets SE.	5,960.00	75,827.2	.0785	Stoves.
Garage for the pound and stable of the health department, South Capitol and I Streets SW.	2,641.00	12,271.5	.2152	Steam.
Third shelter, for farmers' produce market, B Street between Tenth and Twelfth Streets NW.	13,632.00	274,908.4	.0495	None.

<sup>1</sup> Exclusive of cold storage.<sup>2</sup> Without heating and ventilation.

The plans and specifications for all buildings for which appropriations had been made were completed within the fiscal year, with the exception of the municipal lodging house, the Eastern High School, and the Woodbridge and Langdon Schools. Plans for the lodging house were prepared for a site on C Street, but on account of some hitch in the negotiations this site was abandoned and a second set of plans prepared for a site on Louisiana Avenue. In the case of the Eastern High School preliminary sketch plans have been made, and the planning and arrangement of the building has been under very careful consideration by the principal of the school and the corps of instructors. These plans involve a great amount of work and require the services and advice of experts in the various branches of the work, such as heating and ventilation, including automatic control, lighting, and electric time and program systems, and the very extensive mechanical equipment of laboratories and shops. These plans will be completed next fall, when it is hoped that the conditions in the business will be more certain or nearer normal. At the present prices of labor and material the estimate and appropriation for this building would fall far short of accomplishing the expectations with respect to this high school.

I would call attention to the fact that the estimates for buildings are made about one year in advance of the appropriations, and that by the time work is advertised for bids about 18 months or more have elapsed. Within the last 18 months the cost of labor and material has advanced to such an extent that 11 of our buildings have overrun the funds available from 20 to 40 per cent. The official estimates were reduced in transmission, and further reduced, in several instances, after transmission, and this, with the advance in cost of buildings, made it impossible to reduce the size or character of 11 of the buildings to bring the work within the lowest proposals. At the Central High School the bids for improvements and alterations ran over the allowances, and the work is being done by day labor, under supervision of the superintendent of construction in this office. The bids for the public-convenience station at Fifteenth and H Streets NE. ran over the appropriation, and this work was completed by the office within the appropriation. The bids for the Chevy Chase School were higher than the appropriation, and the heating and ventilating was eliminated and \$15,000 additional requested for this work. The bids for the Burrville School exceeded the appropriation about 16 per cent. The contractors' proposals for the foundry at the McKinley Manual Training School exceeded the appropriation about \$2,000. The bids for the addition at the Benning School exceeded the appropriation, and the plans and specifications are being revised and estimates made by the office with the intention to construct this addition by day labor. The contractors' proposals for the greenhouse at the Wilson Normal School exceeded the appropriation, and the work was done by the office within the appropriation. The bids for the garage at the pound exceeded the appropriation, and part of this work was contracted for and part done by this office to bring the cost within the appropriation. The bids for two swimming pools far exceeded the appropriation and additional funds have been requested, but the advance in labor and materials has been so great that the original appropriation may have to be doubled. The bids for the cells, etc., in the second precinct police station exceeded the appropriation, which lapsed on June 30, 1917. The bids for the Home for the Aged, at Blue Plains, exceeded the appropriation; and the work is now being done by the superintendent of the home, under the supervision of this office.

Besides the high cost of labor and materials, the scarcity of labor and carpenters has been a serious obstacle to progress on the work undertaken by this office, and has also held back the buildings under contract. It is expected that this condition will improve after the Army camps have been completed. Had it not been for this difficulty in obtaining labor and mechanics, I would have recommended that more work be done by the office where the bids are too high.

*Repair work.*—During the year the repair shop was remodeled and arranged for the more systematic and orderly storage of the stock and materials. Sheds were constructed for the protection of materials in the yard, and the office was supplied with conveniences and appliances for better transaction of work and proper methods for filing papers and issuing orders. The engineering assistant to the municipal architect was placed in charge of the office work at the shop to enable the superintendent of repairs to give more frequent personal inspection of the actual work of repair. This shop, since it was transferred to the supervision of the municipal architect by act of Congress in 1909, has enlarged its usefulness to a great extent. Formerly much of the work was done by contract, and necessarily small jobs, such as repairs to plumbing fixtures, heating apparatus, and similar work cost a great deal on account of the time consumed by bidders for the work in making up bids for work which in many instances did not require as much time for the actual performance of the work as it did to prepare estimates and submit bids. Of course, this time was added to the price charged in addition to the contractors' profits. During the past year we have installed machinery

in the shop to still further expedite the work and take over some work which formerly had to be given out as we had no equipment to handle it. During the year an electrician has been employed to look after small jobs in this important branch of the work which heretofore has been put out to contractors.

The new system of property accounting has been inaugurated and the office force has been reorganized, but the work at the shop has increased much more rapidly than the force, and the office employees are much overworked.

The District now has about 300 buildings and grounds to be kept in repair, and the stock on hand at the shop amounts to about \$25,000. We are in need of improved transportation by motor trucks for material and men, as the buildings are scattered all over the District, some within a few hundred yards of the District lines. An effort will be made to so arrange the repair work that the bulk of the work on the interior of the schools will be done during the summer vacation while the schools are closed, and work on the exterior and on other District buildings will be done throughout the balance of the year. It is also the intention to prepare more work in the shop, especially metal and sheet-metal work, for which machines have been installed, and carpentering, and for the latter purpose additional woodworking machinery will be added as rapidly as funds permit. In this way it is expected that mechanics employed at the shop will be able to make more time than formerly, and that their services will be almost continuous and not dependent solely on the outside work and not affected by the weather.

Recommendations have been made in the estimates for an adjustment of wages, based upon the conditions surrounding their employment at the shop. I submit herewith a report from the superintendent of repairs showing the amount expended in labor and material on each and every building repaired.

I would call attention to the very economical manner in which the repair shop has been conducted. In previous annual reports costs of repairs have been given in comparison with the costs in other cities of nearly equal importance and size. These costs have been reduced to the cost per square foot of floor surface, cost per building, per room, and per pupil on average attendance. The cost has also been figured in ratio to the entire costs of the schools in this and other cities, and from these figures it appears that Washington is next to the lowest in cost of repairs, notwithstanding the fact that we are here at a disadvantage in cost comparisons for the reason that in other cities the actual "repairs"—that is, replenishments—are paid from one fund, and the "improvements"—that is, enlargements or changes or betterments—are paid from another fund, while here all those things are charged to "repairs." This, of course, makes it appear at first sight that our repairs cost more than they really do.

I would further invite attention to the fact that the buildings upon which repairs are required increase at the rate of about 10 each year, and last year two large high schools were added to the number of buildings to be cared for. With the advance in cost of labor and material and the requests for a further increase in wages of the mechanics at the shop, the repair funds for the buildings should be proportionately increased.

*Workhouse and reformatory.*—The order of the commissioners, of January 28, 1916, directed the municipal architect to supervise the construction work at the workhouse and reformatory; to prepare estimates for such work; make a ground plan and a layout for the reformatory; consult with the penal commission and the superintendent and obtain their opinions on such work; collect and assemble in his office all plans and specifications heretofore made for the workhouse and reformatory, and prepare estimates for additional buildings. On September 30, 1916, the commissioners issued an order establishing at the workhouse and reformatory a "division of construction and repair," and providing for a "constructing engineer," to be in charge of the engineering and construction work at the institution. In accordance with these orders, all plans, etc., available, were collected in this office, and a layout of the grounds and buildings was prepared and submitted to the penal commission and the commissioners. Their opinions were obtained as to the type and character of the buildings and were recorded in the minutes of the meetings at which such matters were considered. A constructing engineer was appointed in October, 1916, who has taken charge of the constructing work and has reported to the engineer commissioner weekly, through this office, as to the progress on the work and as to the preparation of plans and estimates. I submit herewith his report for the fiscal year. This is the first annual report dealing with the "construction and repair" work at these institutions, and as the bookkeeping and accounts have not been kept heretofore with the intention of submitting such a report, the figures in some instances are estimated, or as nearly approximated as the data obtainable at this time will permit. In this connection, I would say that the constructing engineer is employed in the drafting room and about the reservation, and therefore has no time for the keeping of accounts or the issuing of materials. I have consulted the auditor as to an improvement in the

system of stock issue and accounts which will afford a more ready and reliable means for the preparation of reports on the cost of construction work. In the commissioners' order of September 30, 1916, it is provided that the commissioners will appoint assistant engineers, draftsmen and skilled laborers, from time to time, according to the demands of the work. I would recommend that a copyist be employed to install a system of accounts covering the issue of building material and the cost of all the engineering and construction work at the workhouse and reformatory.

S. ASHFORD,  
*Municipal Architect, District of Columbia.*

## REPAIRS TO MUNICIPAL BUILDINGS.

*Public schools, 1917, repairs to buildings.*

School.	Labor.	Material.	Contract.	Total.
Abbot.....	\$676.10	\$212.33	.....	\$888.43
Adams.....	101.85	48.34	.....	150.19
Addison.....	87.00	61.64	.....	148.64
Ambush.....	848.54	573.51	.....	1,422.05
Anidorn.....	256.61	262.77	.....	519.38
Armstrong Manual Training.....	419.90	554.99	.....	974.89
Arthur.....	57.73	66.80	.....	124.53
Banneker.....	125.27	94.23	.....	219.50
Bates Road.....	1.65	2.53	.....	4.18
Bell.....	224.63	371.08	.....	595.71
Benning.....	102.77	87.89	.....	190.66
Berret.....	264.15	83.26	.....	347.41
Birney and Annex.....	705.77	257.58	.....	1,023.35
Blair.....	557.79	445.90	.....	1,002.79
Blake.....	148.73	234.70	.....	383.43
Blow.....	741.73	629.02	.....	1,370.75
A. Bowen.....	517.09	117.65	.....	634.74
S. J. Bowen.....	424.59	605.22	\$181.50	1,211.31
Bradley.....	415.90	109.76	.....	525.66
Brent.....	312.02	276.54	.....	588.56
Briggs.....	1,248.42	670.50	125.00	2,043.92
Brightwood.....	659.84	364.63	.....	1,024.47
Brightwood Park.....	734.03	385.78	.....	1,119.81
Brookland.....	2,449.28	711.21	.....	3,160.49
Brown and portables.....	144.92	194.40	.....	339.32
Bruce.....	40.37	60.49	.....	100.86
Bryan.....	115.13	82.94	.....	198.07
Buchanan.....	43.83	47.97	.....	91.80
Bunker Hill.....	66.49	34.32	.....	100.81
Burrville.....	153.58	60.02	.....	213.60
Business High.....	1,191.61	1,609.94	.....	2,801.55
Carbery.....	148.06	67.64	.....	215.70
Cardoza.....	368.67	416.24	.....	784.91
Cardoza Manual Training.....	82.67	28.53	.....	111.20
Central High (old).....	295.66	158.82	458.70	913.18
Central High (new).....	13.82	23.26	.....	37.08
Chain Bridge.....	54.00	44.08	.....	98.08
Cleveland.....	259.34	106.86	.....	366.20
Conduit Road.....	28.77	16.38	.....	45.15
Congress Heights.....	302.46	192.70	33.00	528.16
J. F. Cook.....	260.92	136.89	.....	397.81
H. D. Cooke.....	214.24	90.41	.....	304.65
Corcoran and portables.....	58.44	36.72	.....	95.16
Cranch.....	401.63	282.25	.....	683.88
Crummell.....	86.88	71.11	.....	157.99
Curtis.....	972.44	282.96	.....	1,255.40
Dennison.....	1,557.11	841.39	.....	2,398.50
Deanwood.....	219.22	103.21	19.80	342.23
Dent.....	240.89	159.33	.....	400.22
Douglas.....	84.64	98.71	.....	183.35
Dunbar.....	62.44	144.68	.....	207.12
Eastern High.....	498.36	408.40	.....	906.76
Eaton.....	171.84	54.81	.....	226.65
Eckington.....	90.38	50.15	.....	140.53
Edmonds.....	208.33	198.39	.....	406.72
Emery.....	322.47	679.63	.....	1,002.10
Fairbrother.....	155.45	90.83	.....	246.28
Fillmore.....	38.62	29.67	.....	68.29
Force.....	214.64	84.79	823.68	1,123.11
Franklin.....	652.21	219.53	.....	871.74
French.....	62.79	29.07	.....	91.86
Gage.....	84.26	68.49	.....	152.75
Gales.....	107.37	52.10	.....	159.47
Garnet.....	1,143.41	679.66	.....	2,123.07
Garfield.....	307.78	231.82	.....	539.60
Garrison.....	288.88	294.48	.....	583.36
Giddings.....	594.48	647.44	.....	1,241.92

*Public schools, 1917, repairs to buildings—Continued.*

School.	Labor.	Material.	Contract.	Total.
Grant...	\$257.46	\$119.00	.....	\$376.46
Greenleaf...	539.25	197.32	.....	736.57
Hamilton...	885.52	443.55	.....	1,329.07
Harrison...	303.72	315.11	.....	618.83
Hayes...	515.03	487.42	.....	1,002.45
Henry...	230.65	121.14	.....	354.79
Hilton...	160.66	55.21	.....	215.87
Hubbard...	232.17	483.53	.....	735.70
Hyde...	55.62	25.32	.....	80.94
Industrial Home School...	190.23	61.15	.....	251.38
Jackson...	721.85	179.36	.....	904.21
Jefferson...	1,300.05	440.58	.....	1,740.63
Johnson and Annex...	645.84	114.83	\$6,958.94	7,719.61
Jones...	309.11	72.47	.....	381.58
Kenilworth...	408.51	216.45	.....	624.96
Ketcham...	126.69	44.90	.....	171.59
Langdon...	270.07	200.67	.....	470.74
Langston...	583.95	338.53	.....	922.48
Lenox...	418.66	509.22	.....	927.88
Lincoln...	509.79	336.58	.....	846.37
Logan...	255.92	94.22	.....	350.14
Lovejoy...	839.35	545.25	.....	1,381.60
Ludlow...	980.12	663.86	111.50	1,755.48
M Street High...	47.58	11.63	.....	59.21
M Street heating plant...	145.47	55.05	.....	200.52
Madison...	85.83	37.13	.....	122.96
Magruder...	302.08	114.03	.....	416.11
Maury...	725.49	219.78	.....	945.27
McCormick...	163.88	143.63	.....	307.51
McKinley...	1,330.38	774.70	.....	2,105.08
Military Road Annex...	13.13	11.04	.....	27.17
Mine Normal...	207.92	92.30	.....	300.22
Monroe...	339.80	180.36	.....	520.16
Montgomery...	434.41	833.61	.....	1,288.02
Morgan...	219.21	359.30	.....	608.51
Morse...	73.36	34.99	.....	108.35
New Mott...	192.48	50.03	.....	212.51
Old Mott...	23.89	3.72	.....	27.61
Orr...	195.74	208.20	.....	403.94
O Street Manual Training...	32.69	44.93	.....	77.02
Park View portable...	1,264.17	42.91	200.00	1,507.08
Patterson...	174.35	205.25	.....	469.60
Payne...	571.75	455.12	.....	1,026.87
Peabody...	1,578.28	402.15	.....	2,040.43
Petworth and Annex...	322.14	417.04	.....	739.18
Pheins...	338.64	408.76	.....	807.40
Phillips...	123.19	56.78	.....	179.97
Pierce...	95.52	239.92	.....	355.44
Polk...	93.47	52.80	.....	146.36
Potomac...	21.05	21.92	.....	42.97
Powell...	1,189.73	649.91	137.50	1,977.15
Randall...	1,500.74	167.45	.....	1,758.19
Randle Highlands...	344.73	57.88	.....	402.61
Reno...	112.00	229.37	.....	341.37
Reservoir...	63.80	44.94	.....	108.74
Ross...	167.91	39.44	.....	207.35
Seaton...	558.95	184.16	619.50	1,333.61
Simmons...	26.20	20.82	.....	47.02
Slater...	423.09	480.76	.....	903.85
Fort Slocum...	50.49	60.68	.....	111.17
Smallwood...	1,010.05	618.01	.....	1,628.06
Stanton...	189.09	105.43	.....	294.52
Smothers...	57.49	36.26	.....	93.75
Stevens...	481.50	428.96	.....	910.46
Sumner...	1,322.27	649.21	616.00	2,587.48
Syphnx...	512.53	424.43	.....	967.01
Takoma...	158.60	90.67	.....	249.27
Taylor...	389.17	601.24	.....	990.41
Tenley and Annex...	247.58	152.44	.....	400.02
Thomson...	159.66	301.75	.....	461.41
Threlkeld...	209.07	127.40	.....	336.47
Toner...	52.69	36.54	.....	89.23
Towers...	540.85	581.20	.....	1,122.05
Twining...	156.70	157.17	.....	313.87
Tyler...	101.19	257.54	.....	358.73
Van Buren and Annex...	720.89	303.65	.....	1,024.54
Van Ness...	72.47	77.11	.....	149.58
Wallach...	959.60	467.12	.....	1,426.72
Webb...	465.76	282.57	.....	748.33
Webster...	1,145.37	599.22	.....	1,744.59
Weightman...	173.56	455.17	.....	628.73
Western High...	824.89	1,190.29	.....	2,015.18

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 137

*Public schools, 1917, repairs to buildings—Continued.*

School.	Labor.	Material.	Contract.	Total.
West.....	\$191.76	\$37.63	.....	\$229.39
Whitley and portables.....	394.56	389.10	.....	783.66
Wilson.....	419.83	564.41	.....	984.24
Wilson Normal.....	577.70	244.20	\$94.50	916.40
Wisconsin Avenue Manual Training.....	13.93	3.63	.....	17.56
Woodburn.....	41.39	37.21	.....	78.60
Wormley.....	119.42	76.05	.....	195.47
W. Massachusetts Avenue NE.....	1.00	.36	.....	1.36
Various schools (on written orders in shop).....	13,240.69	2,259.01	.....	15,499.70

## SUMMARY.

Corporation.....	\$150,000.00
Running stock on hand, June 30, 1916.....	19,994.32
Less per cent on outside orders for superintendency.....	4,598.09

Total amount of labor accounted for on written orders.....	\$74,268.96
Total amount of material accounted for on written orders.....	41,727.70
Total amount of contracts and shop orders.....	10,370.62
Consumed (pro rata share).....	34.72
Electrical current consumed.....	18.48
Blacksmithing and blacksmith work done by shop.....	689.42
Crating of materials.....	42.46
Removal to cement warehouse and property yard.....	123.68
Repair to engineer stables.....	107.92
Repair for improving yard at Lovejoy School.....	75.00
Repair for trimming trees at Western High School.....	8.00
Obtained for various work at new Central High School.....	3,127.25
Purchase for furnace castings.....	7,615.00
Purchase of forage.....	1,683.17
Purchase for car tickets.....	300.00
Purchase of coal.....	312.32
Purchase of Burroughs adding machine (pro rata share).....	264.00
Purchase of comptometer adding machine.....	250.00
Purchase of blank forms for use in Shoupalinger manifolding machines.....	202.30
Purchase of carbon paper for use in Shoupalinger manifolding machines.....	30.00
Purchase of harness.....	220.00
Purchase of two Underwood typewriters.....	146.20
Purchase of Little Wonder concrete mixer (pro rata share).....	429.94
Purchase of two dump wagons.....	269.68
Purchase of blank forms for office use.....	174.87
Purchase of 100 pounds paper bags.....	76.80
Purchase of architect's rod, level, drafting instruments, and detail paper.....	66.10
Purchase of rubber stamps, pads, desks, tables, ledgers, binder, tacks, envelopes, glass tops for five desks, inkstands, chair, file cases, guides and alphabet, manila folders, and matches for use in office.....	691.60
Purchase of linoleum for office floor.....	212.75
Purchasing of postal cards.....	32.59
Purchase of tools.....	895.81
Fractional differences in prices on material, caused in issuing small quantities, and the difference in prices of District of Columbia contract schedule for the fiscal years 1916-17.....	5,482.79
Expenditures.....	126.61

		150,076.74
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Running stock on hand, June 30, 1917..... 24,515.67

*Fire department, 1917, repairs to engine houses.*

House.	Labor.	Material.	Contract.	Total.
No. 1 engine.....	\$43.70	\$27.46	\$7.30	\$78.46
No. 2 engine.....	96.18	54.84	.....	151.02
No. 4 engine.....	173.67	260.74	5.00	439.41
No. 5 engine.....	62.27	36.10	.....	98.37
No. 6 engine.....	34.51	21.57	.....	67.05
No. 7 engine.....	78.13	30.04	.....	108.17
Fire department repair shop.....	251.01	231.65	.....	482.66
No. 8 engine.....	475.38	310.97	.....	786.35
No. 9 engine.....	68.74	52.98	.....	121.72
No. 10 engine.....	706.59	409.26	.....	1,115.85
No. 11 engine.....	377.48	187.32	.....	564.80
No. 12 engine.....	88.52	61.78	.....	150.30
No. 13 engine.....	620.07	482.71	.....	1,102.78
No. 14 engine.....	45.82	26.44	.....	72.26
No. 15 engine.....	479.80	251.85	3.25	734.90
No. 16 engine.....	280.59	171.72	.....	452.31
No. 17 engine.....	69.26	23.94	.....	93.20

*Fire department, 1917, repairs to engine houses—Continued.*

House.	Labor.	Material.	Contract.	Total.
No. 18 engine.....	\$528.39	\$343.47	.....	\$871.86
No. 19 engine.....	252.96	105.10	\$15.05	373.11
No. 20 engine and No. 12 truck.....	107.80	47.65	.....	155.45
No. 21 engine and No. 9 truck.....	194.03	121.44	.....	315.47
No. 22 engine and No. 11 truck.....	84.53	65.15	.....	149.68
No. 23 engine.....	65.25	36.20	.....	101.45
No. 24 engine.....	36.31	28.49	.....	61.80
No. 25 engine and No. 8 truck.....	140.27	82.99	.....	223.26
No. 26 engine.....	111.84	74.23	1,427.69	1,613.76
No. 28 engine.....	.....	.94	.....	.94
No. 27 engine and No. 1 chemical.....	71.78	55.79	.....	127.57
No. 2 chemical.....	67.12	16.58	.....	83.70
No. 1 truck.....	121.67	59.05	.....	180.72
No. 2 truck.....	67.73	41.21	.....	108.97
No. 3 truck.....	203.96	95.48	141.00	440.44
No. 4 truck.....	149.10	91.55	.....	240.65
No. 5 truck.....	104.06	142.35	45.00	291.41
No. 6 truck.....	109.51	60.64	.....	170.15
No. 7 truck.....	24.65	11.23	.....	35.88
No. 10 truck.....	180.87	55.67	.....	236.54
Various engines (on written orders in shop).....	258.44	36.22	.....	294.66

## SUMMARY.

Total amount of labor accounted for on written orders.....	\$6,831.99
Total amount of material accounted for on written orders.....	4,212.83
Total amount of contracts and shop orders.....	1,635.26
Allotment for wages of inspector at property yard.....	59.19
Allotment to engineer stables.....	71.95
Gas consumed (pro rata share).....	3.67
Purchase of Burroughs adding machine (pro rata share).....	24.00
Purchase of Little Wonder concrete mixer (pro rata share).....	56.98
Purchase of forage.....	192.21
Unexpended.....	122.02
	13,230.10
Appropriation.....	13,560.00
Expended.....	13,230.10

Credited school stock..... 269.90

*Metropolitan police, 1917, repairs to stations.*

House.	Labor.	Material.	Contract.	Total.
No. 1 station.....	\$289.25	\$156.78	\$6.00	\$452.03
No. 2 station.....	37.39	15.83	.....	53.22
No. 3 station.....	40.64	34.61	14.75	90.00
No. 4 station.....	90.38	44.95	112.00	247.33
No. 5 station.....	524.18	295.90	.....	820.08
No. 6 station.....	312.60	107.05	2,537.81	2,957.46
No. 7 station.....	211.86	132.87	.....	344.73
No. 8 station.....	109.21	135.70	200.82	445.73
No. 9 station.....	106.97	127.69	.....	234.66
No. 10 station.....	59.99	44.83	.....	104.82
No. 11 station.....	204.39	78.24	20.70	303.33
Tenley substation.....	6.70	3.32	.....	10.02
Harbor precinct.....	.....	.....	5.70	5.70
Various stations (on written orders in shop).....	194.38	11.01	.....	205.39

## SUMMARY.

Total amount of labor accounted for on written orders.....	\$2,187.91
Total amount of material accounted for on written orders.....	1,188.78
Total amount of contracts and shop orders.....	2,897.78
Purchase of forage.....	192.21
Purchase of Burroughs adding machine (pro rata share).....	12.00
Purchase of Little Wonder concrete mixer (pro rata share).....	31.08
Allotment to engineer stables.....	71.95
Allotment for wages of inspector at property yard.....	30.00
Gas consumed (pro rata share).....	2.00
Unexpended.....	142.52
	6,756.26

Expended..... 6,756.26  
Appropriation..... 6,500.00

Due school stock for material, in amount..... 256.26

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 139

*Courts, 1917—Police court, repairs to building.*

Appropriation.....	\$1,000.00
Expended.....	999.41
Unexpended.....	.59

*Contingent and miscellaneous, 1917—Motor vehicles.*

[Municipal architect.]

Allotment.....	\$800.00
Expended.....	798.56
Unexpended.....	1.44

*Appropriation “Repairs to buildings injured by fire, 1917.”*

The following amounts were expended on the buildings named below in making repairs due to fire damage:

Morse.....	\$113.13
No. 1 station.....	16.00
No. 28 engine.....	18.38
No. 5 truck.....	82.07

*Contingent and miscellaneous expenses, 1917.*

## REPAIR SHOP, CHANGES.

Appropriation.....	\$4,800.00
Expended.....	4,800.00

## REPAIR SHOP, MACHINES.

Appropriation.....	\$3,500.00
Expended.....	3,498.31
Unexpended.....	1.69

## REPAIR SHOP, SHED.

Appropriation.....	\$1,600.00
Expended.....	1,600.00

*Buildings and grounds, public schools—Grading, etc., J. F. Cook School No. 30.*

Appropriation.....	\$3,000.00
Expended.....	3,000.00

*Health department, 1917—Repairs to buildings, reservation No. 13.*

Appropriation.....	\$2,500.00
Credits.....	32.97
Expended.....	2,532.97
	2,531.11
Unexpended.....	1.86

## REPORT OF CONSTRUCTING ENGINEER.

## WORKHOUSE AND REFORMATORY.

LORTON, VA., August 20, 1917.

Sir: Following is my report on construction work for the year ending June 30, 1917, for the workhouse and reformatory of the District of Columbia at Lorton, Va.

As I was given charge of the construction work on October 2, 1916, all of my records of cost, labor, etc., start with this date and I am obliged to depend upon the commission records for material expended upon construction before my arrival, and, although these records are accurate as to amounts, they do not always show just what particular

job the material was used upon, it being charged simply to construction. Hence, I have also been obliged to credit a large cost to the general head of "Construction," especially on the workhouse.

I have reported the cost of each job under three heads: First, the cost of all material, and paid-force account, which has been chargeable directly against the appropriations for construction; second, the cost of brick, sand, and crushed stone, using the actual cost, the computation of which is explained in another paragraph, and the cost of lumber sawed on the reservation, taking the price set by the superintendent, Mr. W. H. Whittaker, namely, \$19 for the workhouse lumber and \$12 for that sawed at the reformatory; and third, the cost of prison labor, using the net average per capita cost per day as given in the report of Supt. W. H. Whittaker, namely, \$0.587 as the cost per prisoner per day at the workhouse and that given orally by Supt. Whittaker as \$0.75 at the reformatory. I have not computed the cost of the lumber, as I did that of sand, stone, and brick, because while the supplies of the brick clay, sand, and stone in their natural beds are practically inexhaustible and, therefore, of very low value in their natural state, the supply of standing timber is not inexhaustible and has considerable value.

The actual cost of brick, sand, and stone to the institution was computed in the following manner:

Actual cost of brick per 1,000:

Coal consumed per 1,000 brick, 1,506 pounds, at \$0.001542.....	\$2,322
Labor, 3 days per 1,000 brick, at \$0.587.....	1,761
Oil, waste, and repairs per 1,000 brick.....	.100
Depreciation, at 5.56 per cent of \$24,000 per 2,400,000.....	.556
Interest on investment of \$24,000 at 6 per cent for 2,400,000.....	.600
Total.....	5,339

This year there were 2,400,000 brick manufactured at an average consumption of 1,506 pounds of coal per 1,000 brick.

Data on coal, labor, oil, waste, repairs, the life of this plant and the actual cost of the plant was given me by Mr. Deardorff, the superintendent of the brickyard.

To the above \$5.339 must be added, the actual cost of hauling brick to different parts of the reservation. Data necessary to compute the cost of hauling was furnished by Mr. Pugh, the officer in charge of the stable, as follows:

Cost per team of feed, stable, care and upkeep, etc., of team and wagon, \$2 per day. The average value per team (horses and mules) is about \$300. Average life of a team (many are in bad condition when they arrive here) is three years. The average value of wagon is \$120, and will last about five years.

It is possible to haul three loads to the reformatory from the wharf and six loads to the top of the hill at the workhouse from the wharf per day.

COST PER HAUL.

Feed, upkeep, etc., per team, per day.....	\$2,000
Interest on \$300 at 6 per cent (307 days per year).....	.058
Depreciation on team, 12.5 per cent of \$300 (307 days per year).....	.122
Depreciation on wagon, 20 per cent of \$120 (307 days per year).....	.078
Interest on \$120 at 6 per cent (307 days per year).....	.023
Cost of driver per day.....	.587
Total.....	2,868
Cost of team and driver per day.....	2,868
Cost of hauling one load from the wharf to the reformatory.....	.956
Cost of hauling one load from the wharf to the top of hill.....	.478

COST OF SAND PER CUBIC YARD.

The data for computing the cost of sand was given me by Mr. John Seeleman, engineer in charge of machinery, as follows:

Paid labor, \$6 per 150 cubic yards.

Prison labor, 2 men, \$1.174 per 150 cubic yards.

One ton of coal, at \$3.19, used per 150 cubic yards.

Oil and repairs, \$200 for 2,000 cubic yards.

Actual cost of the dredge (secondhand machinery), \$1,200.

Life of the dredge will be about 25 years.

## Cost per cubic yard:

Paid force.....	\$0.040
Prison labor.....	.008
Coal, at \$3.19 per ton.....	.021
Oil, waste, and repairs.....	.100
Interest, at 6 per cent on \$1,200 invested.....	.120
Depreciation, at 4 per cent of \$1,200 annually.....	.080

Total cost of sand per cubic yard at the wharf..... .369

During the year 1916-17, 600 cubic yards were dredged.

## COST OF STONE PER CUBIC YARD.

The data for computing the cost of crushed stone was also given me by Mr. John Seeleman, as this work came under him, and is as follows:

Thirty-four days prison labor per 100 cubic yards.

Paid labor, \$3.50 per 100 cubic yards.

One and one-fourth tons of coal at \$3.19 per 100 cubic yards.

Have averaged \$1,041 for oil, waste, and repairs for 7,572 cubic yards.

Three thousand three hundred dollars is the actual cost of crusher, cars, track and drills.

The probable life of the plant, although secondhand, is 15 years as we use it.

To this data I have added \$0.071 per cubic yard for dynamite and find by Mr. Whittaker's report that 4,307 cubic yards of stone were crushed in the year 1916-17.

## Cost per cubic yard:

34 days' prison labor, at \$0.587, \$19.958 per 100 cubic yards.....	\$0.200
Paid labor.....	.035
1½ tons of coal, at \$3.19, \$3.988 per 100 cubic yards.....	.040
Average oil, waste, and repairs (4,307 cubic yards).....	.242
Dynamite and caps.....	.071
Depreciation, 6.75 per cent of \$3,300 (4,307 cubic yards crushed).....	.052
Interest, 6 per cent of \$3,300 (4,307 cubic yards crushed).....	.046

Total cost of crushed stone, at the crusher..... .686

## COST OF THE PRESENT BUILDINGS AT REFORMATORY.

Main building, including the heating tunnel and force account on the temporary stable.

## Material chargeable to the appropriation:

Tools.....	\$83.70
Windows and doors.....	845.65
Cement.....	434.17
Lime.....	60.41
Nails, etc.....	363.51
Lumber.....	1,238.97
Roofing.....	747.43
Screens.....	39.73
Electrical material.....	1,377.94
Plumbing, steamfitting, etc.—	
Pipe.....	646.99
Lead.....	154.78
Toilets and general plumbing fittings.....	1,287.80
Tools.....	91.85
Miscellaneous.....	160.41
Radiators.....	530.52
Asbestos.....	167.64
Shop material, for repairs.....	49.42
Cement for heating tunnel.....	97.05

Total..... .88,377.97

Force account chargeable to the appropriation:	
Hired carpenters.....	\$2,904.00
Hired carpenter helpers.....	246.00
Hired bricklayers.....	112.50
Total.....	\$3,262.50
Cost of drafting work, 86 days, at \$4.58 per day.....	393.88
 Total chargeable to appropriation.....	 12,034.35
 Brick, sand, crushed stone, and lumber: Not over 500 bricks or 1 cubic yard of stone or sand can be hauled from the workhouse wharf to the reformatory per load, so the cost of hauling is \$1.91 per 1,000 brick and \$0.96 per cubic yard of sand or stone:	
Brick, 59,200, at \$7.25 (brick, \$5,339 plus haul, \$1,912).....	429.20
Sand, 199 cubic yards, at \$1.32 (dredging \$0.360, haul \$0.956).....	262.68
Crushed stone, 318 cubic yards (crushing \$0.686, haul \$0.956).....	521.52
Lumber, sawed, 83,053 feet, at \$12.....	996.63
 Total for material produced on reservation.....	 2,210.03
 Cost of prison labor and hauling:	
Concrete floors.....	228.31
Stable.....	15.20
Hauling, labor.....	36.98
Hauling, teams.....	138.51
Carpenters.....	126.78
Wiring (electrical).....	116.74
Poles for lights (electrical).....	123.07
Steam fitting.....	255.33
Roughing in.....	114.47
General plumbing.....	354.75
Hauling—	
Cement and lime.....	20.08
Lumber.....	29.64
Roofing.....	6.69
 Total.....	 1,566.55
 Bought material and hired force.....	12,034.35
Material manufactured.....	2,210.03
Prison labor and hauling.....	1,566.55
 Total.....	 15,810.93
 BAKERY.	
Bought material chargeable against the appropriation:	
Cement.....	\$184.50
Lime.....	11.85
Lumber.....	185.91
Roofing.....	53.75
Miscellaneous.....	29.77
 Total.....	 465.78
Paid force account charged to main building—	
Drafting, 4 days, at \$4.57.....	18.28
 Brick, 11,500, at \$7.25 (brick \$5,339, haul \$1,912).....	83.38
Stone, 21 cubic yards, at \$1.642 (crushing \$0.686, haul \$0.956).....	34.48
Sand, 8 cubic yards, at \$1.325 (dredging \$0.369, haul \$0.956).....	10.60
Native lumber charged against main building.	
 Total.....	 128.46

**OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.**      **143**

Prison labor:		
Excavating.....		\$13.50
Foundation work.....		30.00
Brickwork.....		47.25
Foundation for oven.....		108.00
Hauling—		
Cement.....		7.69
Lumber.....		5.74
Roofing.....		.96
Total.....		<u>213.14</u>
Bought material and hired force.....		484.06
Material manufactured.....		128.46
Prison labor and hauling.....		<u>213.14</u>
Total cost, except paid labor and native lumber.....		<u>825.66</u>

**HEATING PLANT.**

Bought material chargeable against the appropriation:		
Cement.....		\$63.09
Lime.....		8.69
Roofing.....		49.45
Tools.....		.50
Grates.....		78.30
Stack.....		110.00
Miscellaneous.....		142.88
Boiler repairs.....		25.00
Total.....		<u>477.91</u>
Drafting, 8 days, at \$4.57.....		<u>36.56</u>
Chargeable against appropriation.....		<u>514.47</u>

Manufactured material:		
Brick, 44,000, at \$7.25 (brick \$5.339, haul \$1,912).....		319.00
Sand, 31 cubic yards, at \$1.325 (dredging \$0.369, haul \$0.956).....		41.28
Lumber charged against main building.		
Total.....		<u>360.28</u>

Prison labor:		
Excavating and placing boiler.....		29.98
Carpenters on roof.....		10.50
Brickwork.....		10.95
Stack.....		15.85
Total.....		<u>67.28</u>
Bought material and hired force.....		514.47
Manufactured material.....		360.28
Prison labor and hauling.....		<u>67.28</u>
Total cost, except paid labor and native lumber.....		<u>942.03</u>

**STABLES.**

Bought material, chargeable against the appropriations; force account and rough lumber charged against the temporary buildings:		
Roofing.....		\$165.55
Electric wire.....		12.87
Nails and miscellaneous.....		20.72
Windows, etc.....		73.60
Total.....		<u>272.74</u>

## ASSISTANT SUPERINTENDENT'S HOUSE.

Bought material:	
Closet tank.....	\$9.25
Closet seat.....	1.75
Total.....	11.00
No brick, sand, or stone used.	
Prison labor:	
Work on water main.....	85.50
Electrical work.....	7.50
Total.....	93.00
Bought material.....	11.00
Prison labor.....	93.00
Total.....	104.00

## TEMPORARY PUNISHMENT HOUSE.

Bought material, force account, and rough lumber charged against temporary buildings:

Roofing.....	\$31.50
Sash.....	9.02
Total.....	40.52
Material bought, chargeable to the appropriation:	
Lumber for dining-room tables.....	141.00
Office furniture for constructing engineer.....	125.90
Office paper, drafting.....	5.58
Broom shop.....	10.09
Total.....	283.67

## POWER AND TELEPHONE LINE.

Material bought, chargeable to the appropriation:

Wire.....	\$2,126.37
Fixtures, etc.....	429.40
Total.....	2,555.77
Poles cut.....	60.00
Prison labor: Setting poles, etc.....	400.53
Total.....	3,016.30

## SEWER WORK.

Material bought, chargeable to the appropriation:

Cost of terra cotta pipe.....	\$3,688.53
Cost of cement.....	11.97
Total.....	3,700.50
No sand, stone, or brick used.	
Prison labor.....	308.66
Hauling.....	73.48
Total.....	382.14
Bought material.....	3,700.50
Prison labor and hauling.....	382.14
Total.....	4,082.64

## WATER MAIN.

Bought material, charged against the appropriation:

Cast-iron pipe.....	\$3,163.03
Lead.....	237.52
Tools.....	38.00
Miscellaneous.....	11.03
Packing.....	29.51
Total.....	<u>3,488.59</u>

No sand, stone, brick, or lumber used.

Prison labor:

Excavating.....	264.44
Setting pipe.....	23.54
Hauling.....	134.00
Total.....	<u>421.98</u>
Bought material.....	3,588.59
Prison labor and hauling.....	<u>421.98</u>
Total.....	<u>4,010.57</u>

## WAGON-ROAD IMPROVEMENT.

Labor.....	\$117.00
Team.....	379.08
Total.....	<u>496.08</u>

## POLLOCK HOUSE.

Bought material:	
Cement.....	\$166.43
Miscellaneous.....	119.13
Laths.....	70.85
Electrical conduit and fittings.....	143.72
Lumber and doors.....	588.70
Roofing.....	50.35
Window shades.....	46.89
Fly screen.....	31.74
Rain spouts.....	40.00
Hardware.....	30.90
Patent stairway.....	36.50
Pipe rail.....	3.40
Radiators.....	180.35
Range.....	36.14
Paint.....	90.00
Hot-water pipe covering.....	31.46
Repairs to old boiler.....	3.90
Total.....	<u>1,670.46</u>

Drafting.....	91.40
Paid labor—	
Carpenters.....	542.50
Carpenters' helpers.....	174.00
Bricklayers.....	267.50

Chargeable to appropriation..... 2,745.86

Brick, 8,700, at \$6.29 (brick 5.339, haul 0.956).....	54.72
Sand, 71 yards, at \$0.85 (dredging 0.369, haul 0.478).....	60.35
Stone, 20 yards, at \$1.16 (crushing 0.686, haul 0.478).....	23.20
Lumber, 7,000 feet, from workhouse at \$10.....	70.00

Material produced on reservation..... 208.27

## CENTRAL POWER PLANT.

Appropriation.	\$20,000.
Radial brick stack.....	\$2,270.00
Water tube boilers and breeching.....	13,960.00
Boiler feed pumps.....	516.00
Feed water heater.....	793.00
Salaries (Langvoigt).....	70.00
Blue prints.....	1.85
Total.....	17,610.85

## REFRIGERATING AND ICE PLANT.

Appropriation.	\$4,000.
Refrigerating equipment.....	\$2,118.00
Cork board.....	957.35
Total.....	3,105.35

## CONSTRUCTION AT THE WORKHOUSE.

General construction, repairs and miscellaneous work by the carpenter shop.  
Bought material:

Cement.....	\$534.60
Lime.....	91.89
Lumber.....	345.43
Roofing.....	110.43
Wire cloth.....	13.41
Tools.....	38.07
Windows.....	109.40
Miscellaneous.....	208.03
Drafting--	
Brooder house, 1 day; commissary, 35 days; cold-storage plant, 6 days; dining room, 4 days; dawsey house improvement, 4 days; furniture design, 7 days; tailor-shop ventilator, 1 day; total, 58 days, at \$4.57.....	265.06

Chargeable to appropriation.....

Material produced by the workhouse:	
Brick, 50,000, at \$6.295 (brick 5.339, haul 0.956).....	3,147.50
Sand, 158 yards, at \$0.847 (dredging 0.369, haul 0.478).....	133.83
Stone, 74 yards, at \$1.164 (crushing 0.686, haul 0.478).....	86.14
Lumber, 133,525 feet, at \$10 per M.....	1,335.25

Total.....

Prison labor: Miscellaneous, 1,454 days, at \$0.587.....	\$833.50
Bought material and drafting.....	1,716.32
Manufactured material and hauling.....	4,702.72
Prison labor.....	853.50
Total.....	7,272.51

## MISCELLANEOUS AND GENERAL REPAIRS BY THE BLACKSMITH SHOP.

Bought material: Miscellaneous, shoes, nails, etc.....	\$540.75
No sand, stone, or brick used.....	
Prison labor: General work, 1,094 days, at \$0.587.....	642.18
Total.....	1,182.93

## PLUMBING SHOP.

General repairs, plumbing, steamfitting, and sheet-metal work.

Bought material:	
Fittings, etc.	\$1,461.03
Miscellaneous	221.17
Hydrants	46.60
Pump	6.00
Boiler, No. 5 Ideal	123.50
Repairs	53.74
Packing	12.48
Chargeable to the appropriation, total	<u>1,924.52</u>

Material produced by the workhouse: Brick, 1,500, at \$6.295 (brick 5.339, haul 0.356)	9.44
Prison labor: Shopwork, etc.	<u>917.48</u>
Bought material	1,924.52
Manufactured material and hauling	9.44
Prison labor	<u>917.48</u>
Total	<u>2,851.44</u>

## GENERAL PAINTING.

Bought material, chargeable to appropriation: Paint and supplies	\$2,885.95
No brick, sand, or stone used	
Prison labor: Painting, 2,084 days, at \$0.587	<u>1,223.31</u>
Bought material	2,885.95
Prison labor	<u>1,223.31</u>
Total	<u>4,109.26</u>

## GENERAL ELECTRICAL WORK.

Repairs, wiring commissary, refrigerating plant, female laundry, telephones, fans, electric lights, etc.

Bought material:	
Coumet	\$15.96
Transformers	132.00
Miscellaneous	397.02
Lamps, etc.	47.72
Fans	184.00
Telephones	88.97
Wire	141.09
Starting box	28.00
Chargeable to appropriation	<u>1,034.76</u>

Material produced by workhouse:	
Sand, 2 yards, at \$0.847 (dredging 0.369, haul 0.478)	1.69
Brick, 1,000, at \$6.295 (brick 5.339, haul 0.956)	6.30
Total	7.99
Prison labor: General work, 303 days, at \$0.587	<u>177.86</u>
Bought material	1,034.76
Manufactured material and hauling	7.99
Prison labor	<u>177.86</u>
Total	<u>1,220.61</u>

## 146 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

## Prison labor:

Excavating, 373 days, at \$0.587.....	\$218.95
Brickwork, 80 days, at \$0.587.....	52.83
Carpenter work, 480 days, at \$0.587.....	281.76
Painting, 56 days, at \$0.587.....	32.86
Plumbing, 58 days, at \$0.587.....	34.05
Plastering, 134 days, at \$0.587.....	78.66
Sewer, 258 days, at \$0.587.....	151.45
Concrete work, 189 days, at \$0.587.....	110.94

Total..... \$961.50

Bought material and hired force.....	2,745.86
Manufactured material.....	208.27
Prison labor.....	961.50

Total cost..... \$3,915.63

## SUPERINTENDENT'S RESIDENCE.

Bought material:	
Paint.....	\$180.50
Cement.....	26.60

Chargeable to the appropriation..... \$207.10

Manufactured material:	
Brick.....	19.70
Stone.....	8.15
Sand.....	4.34
Total.....	<span style="float: right;">32.19</span>

Prison labor:	
Painting.....	62.51
Concrete work.....	23.58
Total.....	<span style="float: right;">86.09</span>

Bought material.....	297.10
Manufactured material.....	32.19
Prison labor.....	86.09
Total cost.....	<span style="float: right;">\$325.38</span>

## RAILROAD GRADING.

Bought material:	
Dynamite.....	\$88.75
Tools.....	11.13
Miscellaneous.....	33.15

Chargeable to the appropriation..... \$133.03

No brick, sand, stone, or lumber charged to grading.	
Prison labor: Grading.....	<span style="float: right;">\$1,353.03</span>

Bought material.....	133.03
Prison labor.....	<span style="float: right;">1,353.03</span>

Total cost..... \$1,486.06

## RAILROAD CULVERT IN QUARRY.

Bought material:	
Cement.....	\$8333.50
Miscellaneous.....	11.44
Lumber.....	32.00

Total..... \$576.94

## Manufactured material:

Sand, 275 cu. ic yards, at \$0.37.....	\$101.75
Stone, 530 cu. ic yards, at \$0.69.....	365.70
Total.....	<u>467.45</u>
Prison labor.....	319.92
Bought material.....	376.94
Manufactured material.....	<u>467.45</u>
Total cost of culvert.....	1,164.31

## DRAFTING WORK FOR REFORMATORY.

## Not yet noted, chargeable to appropriation:

Totten House garage, 2 days, at \$4.57.....	\$9.14
Typical residence studies for workhouse and reformatory, 10 days, at \$4.57.....	45.70
Survey field work, 10 days, at \$4.57.....	45.70
Central power plant, 42 days, at \$4.57.....	191.94
Fresh-air cottages for tubercular patients, 4 days, at \$4.57.....	13.71
Measurements at old workhouse, 1 day, at \$4.57.....	4.57
Development station, 6 days, at \$4.57.....	27.42
Contour map, 12 days, at \$4.57.....	54.84
Total.....	<u>393.02</u>

Appropriation for permanent construction, buildings, etc..... 45,000.00  
 Appropriation for temporary quarters, furniture, and equipment..... 5,000.00

Total..... 50,000.00

## Chargeable to the above appropriations:

Main building, heating tunnel, and force account on stable and bakery.....	12,034.35
Bakery.....	484.66
Heating plant.....	514.74
Stable.....	272.74
Assistant superintendent's house.....	11.00
Temporary punishment house.....	40.52
Miscellaneous.....	283.67
Power and telephone lines.....	2,555.77
Sewers.....	3,700.00
Water main.....	3,588.59
Pollock house.....	2,745.86
Superintendent's residence.....	207.10
Railroad.....	133.03
Railroad culvert.....	376.94
Drafting work for reformatory.....	393.02
Cars, tractors, etc. (not yet delivered).....	12,650.59
Bake oven (contract).....	1,400.00
Salary of constructing engineer.....	1,350.00
Salary of timekeeper, etc., for engineer.....	438.75
Furniture and supplies for construction engineer.....	171.72
Engineers supplies.....	187.42
Paint in commissary.....	122.93
Cement in commissary and not yet delivered.....	1,330.00
Other material in commissary and not yet delivered.....	1,551.40
Amount of drafting work against workhouse.....	416.86
Charged against permanent construction (forage, meats, etc.).....	3,036.08
Total.....	49,996.33

## CENTRAL POWER PLANT.

Appropriation, \$20,000.	
Radial brick stack	\$2,270.00
Water tube boilers and breeching	13,960.00
Boiler feed pumps	516.00
Feed water heater	793.00
Salaries (Langvoigt)	70.00
Blue prints	1.85
Total	17,610.85

## REFRIGERATING AND ICE PLANT.

Appropriation, \$4,000.	
Refrigerating equipment	\$2,118.00
Cork board	957.35
Total	3,105.35

## CONSTRUCTION AT THE WORKHOUSE.

General construction, repairs and miscellaneous work by the carpenter shop.  
Bought material:

Cement	\$524.60
Lime	91.89
Lumber	345.43
Roofing	110.43
Wine cloth	13.41
Tools	38.07
Windows	109.40
Miscellaneous	208.03
Drafting	
Brooder house, 1 day; commissary, 35 days; cold-storage plant, 6 days; dining room, 4 days; dawsey house improvement, 4 days; furniture design, 7 days; tailor-shop ventilator, 1 day; total, 58 days, at \$4.57	265.06

Chargeable to appropriation

Material produced by the workhouse:	
Brick, 50,000, at \$6.295 (brick 5.339, haul 0.956)	3,147.50
Sand, 158 yards, at \$0.847 (dredging 0.369, haul 0.478)	133.83
Stone, 74 yards, at \$1.164 (crushing 0.686, haul 0.478)	86.14
Lumber, 133,525 feet, at \$10 per M.	1,335.25

Total

Prison labor: Miscellaneous, 1,454 days, at \$0.587	853.50
Bought material and drafting	1,716.32
Manufactured material and hauling	4,702.72
Prison labor	853.50

Total

MISCELLANEOUS AND GENERAL REPAIRS BY THE BLACKSMITH SHOP.	
Bought material: Miscellaneous, shoes, nails, etc.	\$540.75
No sand, stone, or brick used.	
Prison labor: General work, 1,094 days, at \$0.587	642.18
Total	1,182.93

## PLUMBING SHOP.

General repairs, plumbing, steamfitting, and sheet-metal work.

Bought material:	
Fittings, etc.	\$1,461.03
Miscellaneous.....	221.17
Hydrants.....	46.60
Pump.....	6.00
Boiler, No. 5 Ideal.....	123.50
Repairs.....	53.74
Packing.....	12.48
Chargeable to the appropriation, total.....	<u>1,924.52</u>

Material produced by the workhouse: Brick, 1,500, at \$6.295 (brick 5.339,

haul 0.956).....	9.44
Prison labor: Shopwork, etc.....	<u>917.48</u>

Bought material.....	1,924.52
Manufactured material and hauling.....	9.44
Prison labor.....	<u>917.48</u>
Total.....	2,851.44

## GENERAL PAINTING.

Bought material, chargeable to appropriation: Paint and supplies.....	\$2,885.95
No brick, sand, or stone used.	
Prison labor: Painting, 2,084 days, at \$0.587.....	<u>1,223.31</u>
Bought material.....	2,885.95
Prison labor.....	<u>1,223.31</u>
Total.....	4,109.26

## GENERAL ELECTRICAL WORK.

Repairs, wiring commissary, refrigerating plant, female laundry, telephones, fans, electric lights, etc.

Bought material:	
Cement.....	\$15.96
Transformers.....	132.00
Miscellaneous.....	397.02
Lamps, etc.....	47.72
Fans.....	184.00
Telephones.....	88.97
Wire.....	141.09
Starting box.....	28.00
Chargeable to appropriation.....	<u>1,034.76</u>

Material produced by workhouse:

Sand, 2 yards, at \$0.847 (dredging 0.369, haul 0.478).....	1.69
Brick, 1,000, at \$6.295 (brick 5.339, haul 0.956).....	<u>6.30</u>
Total.....	7.99
Prison labor: General work, 303 days, at \$0.587.....	<u>177.86</u>
Bought material.....	1,034.76
Manufactured material and hauling.....	7.99
Prison labor.....	<u>177.86</u>
Total.....	1,220.61

## RETAINING WALL AT WHARF.

Bought material:	
Cement.....	\$336.49
Miscellaneous.....	3.94
Chargeable to appropriation.....	310.43

## Material produced by the workhouse :

Brick, 120,000, at \$5.339.....	640.68
Sand, 73 cubic yards, at \$0.369.....	26.94
Stone, 12 cubic yards, at \$0.686.....	8.23

Total..... 675.85

Prison labor: Laying brick, etc., 206 days, at \$0.587..... 120.92

Bought material.....	340.43
Manufactured material.....	675.85

Prison labor..... 120.92

Total cost..... 1,137.20

## Work on the hog pens, boiler house, and slaughterhouse.

Bought material:	
Cement.....	304.32
Lime.....	66.10
Roofing.....	11.20
Cattle wire.....	18.80
Miscellaneous.....	26.96
Total.....	427.38

## Drafting:

Slaughterhouse, 6 days, at \$4.57.....	27.42
Survey, 6 days, at \$4.57.....	27.42

Hog kitchen, 2 days, at \$4.57.....	9.14
-------------------------------------	------

Total..... 63.98

Total chargeable to the appropriation..... 491.36

## Manufactured materials:

Brick, 129,300, at \$6.30 (brick 5.339, haul 0.956).....	814.59
Sand, 119 yards, at \$0.85 (dredging 0.369, haul 0.478).....	101.15
Stone, 102 yards, at \$1.16 (crushing 0.686, haul 0.478).....	118.32
Lumber, 1,000 feet, at \$10 per M.....	10.00

Total..... 1,044.06

## Prison labor:

Brickwork on fence, 594 days, at \$0.587.....	348.68
Brickwork on kitchen, 150 days, at \$0.587.....	88.05
Slaughterhouse, 247 days, at \$0.587.....	144.99

Hauling cement.....	6.99
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Total..... 588.71

## Bought material and drafting.....

491.36

## Manufactured material.....

1,044.06

## Prison labor and hauling.....

588.71

Total cost..... 2,124.13

## Work in shipyard on scows, dredge, etc.

Bought material:		
Suction hose.....	\$78.00	
Miscellaneous.....	74.98	
Bolts, nails, etc.....	25.49	
Tools.....	4.10	
Okum.....	58.71	
Pitch.....	77.18	
Roofing.....	17.60	

Chargeable to the appropriation..... 336.06

No brick, sand, or stone or native lumber used.		
Prison labor: Carpenter work, etc.....	128.55	
Bought material.....	336.06	
Prison labor.....	128.55	

Total..... 464.61

#### CENTRAL POWER-HOUSE STACK.

Prison labor, excavating for foundation, 97 days, at \$0.587.....	\$56.94	
Excavating only was completed by June 30, 1917.		

#### WORK ON WAGON ROADS, REPAIRS.

Prison labor, 286 days, at \$0.587.....	\$167.88	
Cutting away hill at the run on the road to Lorton, thus removing a very dangerous curve: Prison labor, 595 days, at \$0.587.....	468.27	

#### WORK ON RAILROAD.

Grading, 2,131 days, at \$0.587.....	\$1,250.90	
Building quarry trestle, 132 days, at \$0.587.....	77.48	
Laying track, 42 days, at \$0.587.....	24.65	
Total.....	1,353.03	

#### HORSE POND.

Drafting work, 2 days, at \$4.57.....	\$9.14	
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#### REFRIGERATING PLANT.

Cork.....	\$957.35	
Miscellaneous.....	9.05	
Total.....	966.40	

#### POULTRY YARD.

Floor in large brood house.		
Bought material:		
Cement.....	\$110.39	
Miscellaneous.....	4.30	
Wire.....	2.53	
Total.....	117.22	

Material produced on the reservation:		
Brick, 500, at \$6.30 (brick \$5.339, haul \$0.956).....	3.15	
Sand, 28 yards, at \$0.85 (dredging \$0.369, haul \$0.478).....	23.80	
Stone, 40 yards, at \$1.16 (crushing \$0.686, haul \$0.478).....	46.40	

Total.....	73.35	
Prison labor: Concrete work, 107 days, at \$0.587.....	62.81	

Bought material.....	117.22	
Manufactured material.....	73.35	
Prison labor.....	62.81	
Total cost.....	253.38	

## DRAFTING WORK FOR THE WORKHOUSE.

Not yet noted, chargeable to the appropriation:

Plan for location, wiring, plumbing, etc., of the laundry machinery at the female department, 4 days, at \$4.57.....	\$18.28
Work on silo plans, 5 days, at \$4.57.....	22.85
Drawings for brick shed on wharf, 3 days, at \$4.57.....	13.71
Total.....	54.84
Total number of days' work at drafting for workhouse and reformatory, 295.	
Total salary of draftsman 1916-17.....	\$1,350.00
Average cost of drafting work per day.....	4.57

## WORKHOUSE.

Fuel, oil, repairs, manufacturing, and construction.....	\$30,000.00
Material for repairs to buildings, etc.....	4,000.00
Laundry machinery.....	4,000.00
Chargeable to the above appropriations for construction, repairs, etc.:	
Work by carpenter shop and drafting.....	1,716.32
Work by blacksmith shop.....	540.75
Work by plumbing shop.....	1,921.52
Work by paint shop.....	2,885.95
Work by electrical shop.....	1,034.76
Retaining wall.....	310.13
Hog pens and drafting.....	491.36
Work in the shipyard.....	336.06
Horse pond drafting.....	9.11
Refrigerating plant.....	9.05
Poultry yard.....	117.22
Other drafting work not yet noted.....	54.84
Total.....	9,460.40
Subtract for drafting work (charged against reformatory).....	416.86
Balance.....	9,043.54
Total chargeable to the appropriations for construction, repairs, etc. ....	9,043.54
Material in commissary and not yet delivered.....	2,890.73
Brick plant, force account, fuel, stone quarry, etc.....	21,892.95
Total expended.....	33,827.22
Total expended against appropriation for fuel, oil, construction, etc.....	33,827.22
Total expended against appropriation for laundry machinery.....	3,997.00

C. B. BACKUS,  
*Constructing Engineer.*

The MUNICIPAL ARCHITECT.

## REPORT OF THE INSPECTOR OF BUILDINGS.

WASHINGTON, September 14, 1917.

SIR: I submit herewith annual report covering the transactions of the building division during the fiscal year ended June 30, 1917.

No report of Federal Government operations was received during the year.

*Statement of permits issued from July 1, 1916, to June 30, 1917.*

	Number.	Value.		Number.	Value.
Brick:			Hollow tile—Continued.		
Repairs.....	1,200	\$1,219,489	Office.....	1	\$3,000
Dwellings.....	541	2,117,093	Concrete:		
Apartments.....	44	4,815,500	Garages.....	16	4,210
Stores.....	46	281,920	Warehouse.....	1	16,000
Stores and dwellings.....	9	48,500	Dwelling.....	1	1,800
Stores and apartments.....	3	31,680	Shelter station.....	1	500
Office buildings.....	9	1,939,900	Metal:		
Garages.....	393	397,451	Garages.....	524	62,345
Warehouses.....	14	437,875	Sheds.....	29	68,734
Workshops.....	2	1,000	Frame:		
Sheds.....	14	17,352	Sheds.....	316	20,147
Banks.....	2	443,900	Repairs.....	392	67,581
Churches.....	7	294,000	Dwellings.....	254	806,475
Stables.....	3	13,600	Garages.....	136	18,732
Blacksmith shops.....	1	300	Stables.....	6	3,912
Hospital.....	1	5,500	Lodge hall.....	1	2,500
Theater.....	1	5,000	Churches.....	2	3,700
Power houses.....	2	14,000	Elevators.....	131	344,610
Gymnasium.....	1	33,000	Motors.....	454	138,437
Cemetery vault.....	1	23,500	Boilers.....	34	58,780
Hotels.....	4	811,000	Gasoline engines.....	5	1,550
Greenhouses.....	3	3,000	Machinery, installation of.....	2	101,500
Factories.....	3	90,000	Total.....	4,662	15,581,600
Schools.....	3	556,000	Awnings.....	57	4,275
Dyeing plant.....	1	5,500	Fire escapes.....	104	20,800
Store and office.....	1	50,000	Signs.....	640	6,400
Boiler house.....	1	50,000	Grand total.....	5,463	15,613,075
Hollow tile:					
Dwellings.....	25	154,500			
Garages.....	21	6,527			

*Comparative statement for years 1916 and 1917.*

	New buildings.	Repairs, etc.	Dwellings.	Apartments.	Business buildings.
1917.....	1,436	3,226	821	44	571
1916.....	1,839	3,236	1,349	60	430
	1 403	1 10	1 528	1 16	141

1 Decrease.

Valuation of building operations, including awnings, fire escapes, and signs:

1917.....	\$15,613,075
1916.....	13,495,535

Increase..... 2,117,540

Permits issued, number of, including awnings, signs, etc.:

1917.....	5,582
1916.....	5,797

Decrease..... 215

Projections beyond the building line, permits for:

1917.....	1,583
1916.....	1,999

Decrease..... 416

The following summary shows the distribution of improvements in the respective sections of the District and the values of same:

	Buildings,	Repairs, etc.,
Northeast .....	\$509,750	\$81,238
Southeast .....	148,860	67,705
Northwest .....	6,309,532	1,475,271
Southwest .....	48,060	33,090
County .....	6,371,716	146,358
Total .....	13,477,938	2,103,662
Sum total <sup>1</sup> .....	15,581,600	

<sup>1</sup> Does not include awnings, fire escapes, or signs, the values of which are estimated.

Grand total for all building operations, \$15,613,075.

*Estimated number of buildings in the District of Columbia.*

	Brick.	Frame.
1917, erected .....	1,177	259
1917, razed .....	1,119	126
1916 .....	1,058	133
63,590	26,576	
Total estimated number .....	64,648	26,799

<sup>1</sup> The number of razed buildings represents those buildings only for the razing of which permits were issued. The number of buildings in the District, therefore, can only broadly be estimated.

Largely because of the war, the population of the city has materially increased during the latter part of the past fiscal year, yet, notwithstanding the demand for buildings of all kinds was not to be fully met by the supply, the excessive cost of building material, and, in fact, the impossibility of securing structural steel, etc., deterred many owners from improving their property. While a year ago it was believed the city had adequate provision for the then demands of hotels, apartment houses, dwellings, office buildings, and in fact all kinds of buildings with the possible exception of garages, it is felt now that the demand is greater than the supply and that as soon as there is a substantial decrease in the cost of building, a big increase in construction will take place.

By reason of the deterrent situation as outlined above, there was a general falling off in building construction during the past year. The valuation of building operations, though, was over \$2,000,000 greater than in the previous year. In the aggregate, fewer buildings were erected but permits were issued for a greater number of large and more expensive buildings, which accounts for the increased valuation.

The receipts of building fees were correspondingly less and, in consequence, it is necessary to report that the pay roll of the office, including all contingent fees of transportation, etc., exceeded the sum collected for building fees by \$3,298.

The test of the legality of certain fees has not been settled, leaving the question of collection of fees for elevator and hotel inspection still in an unsatisfactory situation.

Under date of June 1, 1917, a new edition of building regulations was printed at a cost of \$836.83, which amount will be recovered by the sale of copies of this code.

The work accomplished by the field force very closely equals that of the previous year. The fire-escape inspector, in addition to his duty of inspecting and locating fire escapes on apartment houses, etc., made a special inspection of all theaters and places of public amusement in the District of Columbia as well as all hotels, public halls, etc., and of all of the public schools. The elevator inspectors examined an increased number of passenger elevators in the city and, as reported in my previous annual report, these two men have reached the limit of their capacity for thorough work and it will be necessary to detail a third inspector to this class of inspection.

As reported to a previous Board of Commissioners, I am impressed with the fact that the remuneration paid the employees of this division is not commensurate with the work they are called on to do. The combination of responsibility, danger, and physical labor which these men bear renders their position most arduous and it is only

possible to hold the more competent men in the responsible positions by an increase in compensation. I earnestly recommend that a general increase in the salaries in this division be requested in the estimates to Congress.

MORRIS HACKER,  
*Inspector of Buildings.*

## REPORT OF INSPECTOR OF STEAM BOILERS.

WASHINGTON, September 20, 1917.

Sir: I have the honor to submit the following report for the fiscal year ended June 30, 1917, together with fees received and expenses incurred:

Boilers inspected.....	447
Boilers inspected for District of Columbia.....	65
Boilers inspected for United States.....	4
Boilers condemned as unfit for further use.....	2
Cases of scale and deposit.....	56
Cases of defective setting.....	10
Cases of defective steam gauges.....	11
Cases of defective tubes.....	34
Cases of defective shell plates.....	7
 Total amount received.....	\$2,235.00
Total amount expended.....	310.00
 Balance.....	1,925.00

Very respectfully,

E. F. VERMILLION,  
*Inspector of Steam Boilers.*

The INSPECTOR OF BUILDINGS.

## REPORT OF THE BOARD OF EXAMINERS OF STEAM ENGINEERS.

WASHINGTON, D. C., September 20, 1917.

Sir: The board of examiners of steam engineers have the honor to submit to you the report for the year ended June, 1917. The following table shows the work as it progressed during each month:

	Meetings held.	Appli-cants received.	Appli-cants ap-proved.	Appli-cants incom-petent.	First class.	Second class.	Third class.	Special class.	Duplic-ate.
<b>1916.</b>									
July.....	4	12	4	8				4	
August.....	4	10	3	7	2			1	
September.....	5	9	2	7		1		1	
October.....	4	6	1	5				1	
November.....	4	6	3	3				3	
December.....	5	12	4	8		1	1		2
<b>1917.</b>									
January.....	4	11	5	6	1	1		3	
February.....	4	4	2	2	1			1	
March.....	5	16	4	12		1	1	2	
April.....	4	11	4	7				1	3
May.....	4	13	4	9				2	1
June.....	5	10	3	7				3	
	52	120	39	81	4	4	22	6	3

In addition to examining applicants for steam engineer's license, the board has also conducted the examination of applicants for automobile and motorcycle operators, a full report of which is being submitted by the secretary of the automobile board.

E. F. VERMILLION,  
H. BOESCH,  
W. I. EVANS,  
*Board of Examiners of Steam Engineers.*

The INSPECTOR OF BUILDINGS.

## REPORT OF THE INSPECTOR OF PLUMBING.

WASHINGTON, D. C., September 24, 1917.

I have the honor to submit the thirty-fifth annual report of the work performed by the division of plumbing inspection for the the fiscal year ended June 30, 1917. The following table shows the work performed by the outside force of assistant inspectors:

Preliminary inspections.....	8,291
Cast-iron sewers:	
New.....	3,226
Repairs.....	861
Terra-cotta sewers:	
New.....	135
Repairs.....	347
Main sewers tapped.....	1,143
Rough work in—	
New houses.....	2,528
Old houses.....	1,754
Water services.....	842
Notices served.....	93
Peppermint tests and final inspections.....	2,750
Work not ready for inspection when ordered.....	528
Changes ordered in work incorrectly installed.....	159
Special inspections of municipal work.....	18
Gas.....	1,908
Complaints.....	5,637
Total.....	30,220

To the above are to be added inspections by the head of the office of a general nature, 3,017; special inspections on construction work for the District, 626; and by the principal assistant inspector of plumbing, examination of materials, visits to the homes of witnesses, and general police work which does not appear elsewhere, 1,326. The total of these inspections should be added to the above total, which gives a general total of 35,189 inspections made by the entire force.

The following table shows the total inspections made each year since the fiscal year 1895:

1895-96.....	8,677	1906-7.....	32,190
1896-97.....	14,112	1907-8.....	29,547
1897-98.....	17,550	1908-9.....	39,404
1898-99.....	17,600	1909-10.....	44,953
1899-1900.....	17,405	1910-11.....	46,035
1900-1901.....	19,965	1911-12.....	45,875
1901-2.....	32,621	1912-13.....	41,644
1902-3.....	25,297	1913-14.....	37,177
1903-4.....	25,637	1914-15.....	37,478
1904-5.....	27,337	1915-16.....	35,742
1905-6.....	30,185	1916-17.....	35,189

It is estimated that the total cost of new plumbing work installed during the year was \$1,111,818, and the estimate of value of repairs and remodeling work is \$375,824, both of which are much greater than for last year.

The total number of inspections made by the outdoor force, 30,220, divided by the total number of days in the field, gives an average of 14½ inspections per day per man. The greatest number of inspections made by any man in one day was 65.

## PER DIEM EMPLOYEES.

With the exception of the men employed as temporary assistant inspectors, etc., under the special appropriation for that purpose, there were no other per diem employees in this office during the past year.

## POLICE COURT CASES.

The total number of warrants obtained was 21, divided as follows:

Violations of the plumbing regulations.....	6
Work done by unlicensed plumbers.....	15
Total.....	21

# OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 157

These cases were disposed of as follows:

Nolle-prossed on compliance with commissioners' order.....	5
Forfeited collaterals.....	2
Fined.....	12
Dismissed.....	2
Total.....	<u>21</u>

Amount collected from fines and forfeitures, \$138.

## OFFICE WORK.

The following table gives the amount of office work performed during the past year and a comparison with that of the five preceding years:

	1912	1913	1914	1915	1916	1917
Official letters.....	2,542	1,915	1,138	877	845	978
Unofficial letters.....	4,973	4,138	3,679	3,957	3,642	3,563
Indorsements.....	2,204	2,118	1,177	1,180	1,300	1,092
Inspectors' reports.....	9,659	9,015	10,262	9,715	9,440	9,345
Indexes.....	1,404	1,683	1,771	1,332	1,400	1,579
Plans prepared.....	33	26	18	30	24	27
Specifications prepared.....	41	34	50	66	55	63
Plans and specifications revised.....	11	1	4	1	3	2
Examination of plans for new building.....	3,256	1,857	1,518	1,486	1,361	1,567
Examination of repair applications.....	3,263	3,138	2,628	3,347	2,955	2,761

Postage stamps used: 2-cent, 1,841; 1-cent, 1,679; postal cards, 88.

Car tickets used, 1,766.

## REGULATIONS.

During the year few changes were made in the regulations, all of the changes made looking to simplification and reduction of the total cost of plumbing to the householders.

## COMPULSORY DRAINAGE.

During the last year 32 cases were recommended for compulsory sewer and water connections by the health department and other branches of the District government. Notices were served in all these cases. Eleven of these notices were complied with by owners or agents, on 8 of the cases the work was done by the District of Columbia and assessment made and there are 13 cases pending.

## PLUMBING BOARD.

During the year there were 24 regular meetings held for the examination and rating of candidates for master plumbers and gasfitters.

The total number examined was 54. The number of original candidates examined for licensing as master plumbers and gasfitters was 14, of whom 2 passed and 12 failed.

Of the 40 who had been previously examined for licensing as master plumbers and gasfitters, 9 of whom have taken the examination twice within the past fiscal year, 12 passed and 19 failed.

Examination of candidates appearing before the board one or more times resulted as follows:

Examination.	Passed.	Failed.	Examination.	Passed.	Failed.
First.....	2	12	Fifth.....	1	1
Second.....	2	10	Sixth.....	2	-----
Third.....	5	5	Thirteenth.....	1	-----
Fourth.....	2	2	Fourteenth.....	1	-----

## PUBLIC CONVENIENCE STATIONS.

There were three public convenience stations in operation during the year, open from 6 a. m. until midnight, in two shifts of attendants, each working nine hours per day. The station at Seventh Street and Pennsylvania Avenue accommodated

2,584,081, that at Thirteen-and-a-half Street and Pennsylvania Avenue, 695,576, and at Ninth and K Streets 882,044 patrons during the year, this being a total of 4,161,701. The female patronage was about 17½ per cent of the total and they contributed about 12½ per cent of the cash receipts. These receipts, amounting to \$3,060.91, were for the use of pay compartments, the furnishing of clean towels, shoe-shine concessions, etc.

Each year shows a substantial increase in patronage not only at individual stations but as a whole and is indicative of the need of more convenience stations, and it is recommended that the commissioners adopt the policy of requesting appropriation for two new stations each year until the congested centers are amply provided for. Heretofore the saloons have provided general accommodations for men, but on November 1 next the saloons will have been closed according to law and the facilities they furnish now will then be unavailable. There is great need for a station at or near the intersection of Fifteenth Street and New York Avenue, in Georgetown, near Peace Monument, near Seventh Street and Florida Avenue, near the steamboat wharves, near Eighth Street and Pennsylvania Avenue SE., near Fourteenth and U Streets, near Fourteenth and Park Road, on Seventh Street NW., in the vicinity of O or P Streets, and other similar centers.

I beg to commend to your consideration the conscientious and efficient service of the personnel of this division.

A. R. McGONEGAL,  
*Inspector of Plumbing.*

#### The INSPECTOR OF BUILDINGS.

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#### REPORT OF THE ELECTRICAL ENGINEER.

WASHINGTON, October 11, 1917.

SIR: I have the honor to submit herewith the annual report of the electrical department for the fiscal year ending June 30, 1917.

Very respectfully,

WARREN B. HADLEY,  
*Electrical Engineer of the District of Columbia.*

#### STREET LIGHTING.

Demands for increase and extension of the street lighting system have been met so far as practicable, discriminations having been based on careful considerations.

#### IMPROVED INCANDESCENT ELECTRIC LIGHTING.

This system has been installed in Maryland Avenue NE., First to Fifteenth Streets; the approaches to Dunbarton Bridge over Rock Creek at Q Street NW.; the Pennsylvania Avenue Bridge over Rock Creek NW., and on the Harvard Street entrance to Zoological Park NW.

This work involved the erection of 183 lamps, nearly all of 100 candlepower each, over approximately 1.7 miles of streets.

#### ARC LIGHTING.

This system has been affected very slightly except by the transfer of the maintenance of forty 6.6 ampere magnetite arc lamps in Union Station Plaza to the jurisdiction of the Chief of Engineers, United States Army.

#### LIGHTS ALONG STEAM RAILROADS.

The situation with respect to the several suits brought by the District of Columbia against steam railroad companies to compel repayment for the sums expended by the District on maintaining lights along the respective rights of way of such companies is as follows:

*Washington Terminal Co.*—Motion by company for new trial, following verdict in favor of District in the amount of \$10,223.22 was denied and the case is now on the way to court of appeals.

A fourth suit against this company has been entered for \$11,087.58 for the period from September, 1914, to July, 1917, both inclusive.

*Philadelphia, Baltimore & Washington Railroad Co.*—The suit filed March 3, 1916, against this company for \$17,178.25 is on the calendar and practically awaiting outcome of the litigation against Washington Terminal Co.

*Lamps of all kinds in service July 1, 1917, as compared with July 1, 1916.*

Kind of light.	1916	1917
Mantle gas.....	10,248	10,392
Electric arc:		
6.6-ampere magnetite.....	317	279
4-ampere magnetite.....	523	522
Electric incandescent:		
250-candlepower, series.....	4	4
100-candlepower, series.....	3,428	3,604
100-candlepower, multiple.....	98	98
60-candlepower, series.....	3,323	3,467
60-candlepower, multiple.....	321	321
1-glove Nernst.....	64	64
Street designation lamps:		
Gas.....	388	392
Electric.....	91	97
Total.....	18,805	19,240

Net increase during year, 435 lamps.

During the year the following changes have been made in the various forms of street lighting:

Kind of light.	Added.	Discon-tinued.
Mantle gas.....	247	1 103
Electric arc:		
6.6-ampere magnetite.....	4	2 42
4-ampere magnetite.....	1	2
Electric incandescent:		
100-candlepower, series.....	187	11
60-candlepower, series.....	145	1
60-candlepower, multiple.....	1	1
Street designation lamps on fire-alarm posts:		
Gas.....	6	3 2
Electric incandescent.....	7	1
Total.....	598	163

Of this number, 84 were replaced by 100-candlepower incandescent electric lamps and 1 by a 60-candlepower incandescent electric lamp.

<sup>2</sup> The maintenance of 40 of these lamps (Union Station Plaza) was transferred to the jurisdiction of the United States Government.

Of this number, 1 lamp was replaced by an incandescent electric (fire-alarm) lamp.

Net increase during the year, 435 lamps.

SUMMARY OF CHANGES.

Net increase in number of lamps.....	435
Discontinued.....	38
Replaced by other kinds.....	85
Transferred to United States Government.....	40
Total charges.....	598

ESTATE PLANNING

1-pair	19,217	557,110	72	2,160	.....	.....	.....	.....	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
2-pair	38,434	1,112,220	144	4,320	6,112	6,112	6,112	6,112	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
3-pair	57,651	1,777,660	288	12,840	20,840	20,840	20,840	20,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
4-pair	76,868	2,443,100	436	20,840	30,840	30,840	30,840	30,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
5-pair	96,085	3,108,540	584	30,840	40,840	40,840	40,840	40,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
6-pair	115,302	3,773,980	732	40,840	50,840	50,840	50,840	50,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
7-pair	134,519	4,438,420	880	50,840	60,840	60,840	60,840	60,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
8-pair	153,736	5,102,860	1,028	60,840	70,840	70,840	70,840	70,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
9-pair	172,953	5,767,300	1,176	70,840	80,840	80,840	80,840	80,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
10-pair	192,170	6,431,740	1,324	80,840	90,840	90,840	90,840	90,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
11-pair	211,387	7,096,180	1,472	90,840	100,840	100,840	100,840	100,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
12-pair	230,604	7,760,620	1,620	100,840	110,840	110,840	110,840	110,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
13-pair	249,821	8,425,060	1,768	110,840	120,840	120,840	120,840	120,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
14-pair	269,038	9,089,500	1,916	120,840	130,840	130,840	130,840	130,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
15-pair	288,255	9,753,940	2,064	130,840	140,840	140,840	140,840	140,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
16-pair	307,472	10,418,380	2,212	140,840	150,840	150,840	150,840	150,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
17-pair	326,689	11,082,820	2,360	150,840	160,840	160,840	160,840	160,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
18-pair	345,906	11,747,260	2,508	160,840	170,840	170,840	170,840	170,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
19-pair	365,123	12,411,700	2,656	170,840	180,840	180,840	180,840	180,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
20-pair	384,340	13,076,140	2,804	180,840	190,840	190,840	190,840	190,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
21-pair	403,557	13,740,580	2,952	190,840	200,840	200,840	200,840	200,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
22-pair	422,774	14,404,020	3,100	200,840	210,840	210,840	210,840	210,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
23-pair	441,991	15,068,460	3,248	210,840	220,840	220,840	220,840	220,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
24-pair	461,208	15,732,900	3,396	220,840	230,840	230,840	230,840	230,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
25-pair	480,425	16,397,340	3,544	230,840	240,840	240,840	240,840	240,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
26-pair	499,642	17,061,780	3,692	240,840	250,840	250,840	250,840	250,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
27-pair	518,859	17,726,220	3,840	250,840	260,840	260,840	260,840	260,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
28-pair	538,076	18,390,660	3,988	260,840	270,840	270,840	270,840	270,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
29-pair	557,293	19,055,100	4,136	270,840	280,840	280,840	280,840	280,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
30-pair	576,510	19,719,540	4,284	280,840	290,840	290,840	290,840	290,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
31-pair	595,727	20,383,980	4,432	290,840	300,840	300,840	300,840	300,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
32-pair	614,944	21,048,420	4,580	300,840	310,840	310,840	310,840	310,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
33-pair	634,161	21,712,860	4,728	310,840	320,840	320,840	320,840	320,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
34-pair	653,378	22,377,300	4,876	320,840	330,840	330,840	330,840	330,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
35-pair	672,595	23,041,740	5,024	330,840	340,840	340,840	340,840	340,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
36-pair	691,812	23,706,180	5,172	340,840	350,840	350,840	350,840	350,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
37-pair	711,029	24,370,620	5,320	350,840	360,840	360,840	360,840	360,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
38-pair	730,246	25,035,060	5,468	360,840	370,840	370,840	370,840	370,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
39-pair	749,463	25,699,500	5,616	370,840	380,840	380,840	380,840	380,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
40-pair	768,680	26,363,940	5,764	380,840	390,840	390,840	390,840	390,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
41-pair	787,897	27,028,380	5,912	390,840	400,840	400,840	400,840	400,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
42-pair	807,114	27,692,820	6,060	400,840	410,840	410,840	410,840	410,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
43-pair	826,331	28,357,260	6,208	410,840	420,840	420,840	420,840	420,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
44-pair	845,548	29,021,700	6,356	420,840	430,840	430,840	430,840	430,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
45-pair	864,765	29,686,140	6,504	430,840	440,840	440,840	440,840	440,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
46-pair	883,982	30,350,580	6,652	440,840	450,840	450,840	450,840	450,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
47-pair	903,200	31,015,020	6,800	450,840	460,840	460,840	460,840	460,840	11,104	11,104	11,104	11,104	11,104	11,104	11,104	11,104
Total	47,838	1,922,985	59,835	1,538,160	3,055,700	632,078	.....	.....	8,794,094	.....	.....	12,180,912	759,771	10,716,962	16,718,502	3,055,700

Installed, 3,88 miles of cable containing 76,215 miles of conductor; withdrawn, 0.93 mile of cable containing 5,780,520 miles of conductor.

*Amount of space occupied by cable installed and withdrawn during year and that in service  
July 1, 1917.*

Owner of space.	Space occupied by cable.		
	Installed during year.	Withdrawn during July 1, year.	In service
District of Columbia.....	9,859	551	181,735
Chesapeake & Potomac Telephone Co.....	8,638	4,077	332,163
Washington Ry. & Electric Co. <sup>1</sup> .....	1,018	300	25,308
United States Government.....			1,596
Western Union Telegraph Co.....			7,180
Washington Terminal Co.....			1,090
Submarine Cable.....			150
Placed in parking.....	900		3,817
Miscellaneous.....	135		3,368
Total.....	20,496	4,928	759,771

<sup>1</sup> Under this name are included the conduits of all companies controlled by this corporation.

*Aerial cable withdrawn during the year and amount in service June 30, 1917.*

WITHDRAWN.

Size of cable.	Telephone.		Combination.				Total.		
	Cable.	Conduc-tors— No. 19, Brown & Sharpe.	Cable.	Conductors (Brown & Sharpe).				Cable.	Conductors (Brown & Sharpe).
				No. 14.	No. 19.		No. 14.		
25-pair.....	Feet. 1,599	Feet. 79,950	Feet.	No.	Feet.	No.	Feet.	Feet. 1,599	Feet. 79,950

IN SERVICE JUNE 30, 1917.

25-pair		7,358	10	147,160	15	220,740	7,358	147,160	220,740
15-pair		8,625	6	103,500	9	155,250	8,625	103,500	155,250
12-pair		9,558	6	114,696	6	114,696	9,558	114,696	114,696
S-pair		852	4	6,816	4	6,816	852	6,816	6,816
Total		26,393	.....	372,172	.....	497,502	26,393	372,172	497,502

In service June 30, 1917, 4,999 miles of cable containing 164.71 miles of conductor.

## TELEPHONE SYSTEM.

The following 48 telephones were added to the two switchboards of the department during the year:

**District Building:**

Offices of the Health Officer, rooms 201 and 203.....	2
Offices of the Purchasing Officer, room 320.....	1
Offices of the Excise Board, room 103.....	2
Offices of the Superintendent of Insurance, room 225.....	1
Offices of the Superintendent of Street Cleaning, room 325.....	1
Offices of the Inspector of Plumbing, room 114.....	2
Offices of the Assessor, rooms 107 and 111.....	2
Offices of the Board of Children's Guardians, corridor, third floor.....	1

## District Building—Continued.

Offices of the Public Utilities Commission, room 309, extension.....	1
Offices of the Collector of Taxes, extension.....	1
Offices of the Superintendent of Trees and Parkings, extension, room 426.....	1
Offices of the Supervisor of Playgrounds, extension, room 2.....	1
Press room.....	1
Blue print room.....	1
Electrical department, extension, room 516.....	1
War Registration Bureau, rooms 5 and 222.....	2
Sewer Department, room 305.....	1

## Outside offices:

House of detention.....	1
District coal dump.....	1
Municipal lodging house.....	1
Soldiers' and Sailors' Home.....	2
Courthouse (Emery Building), office corporation counsel.....	1
Playgrounds, Tenth Street and Virginia Avenue SE.....	1
Residence of fire-alarm repairman, J. J. Murray.....	1
Residence of fire-alarm operator, Arthur James.....	1
Residence of fire-alarm repairman, J. C. Bailey.....	1

## Public schools:

Park View school (two extensions).....	3
Tenley School annex, extension.....	1
Grover Cleveland School.....	1
Atypical School, 1322 Maryland Avenue NE.....	1
Old M Street High School.....	3
Randall School.....	1
Manual Training School, 212 H Street NW.....	1
Manual Training School, 646 Massachusetts Avenue NE.....	1
Manual Training School, Thirty-ninth Street and Windom Place NW.....	1
Henry D. Cook School, extension.....	1
Hamilton School.....	1
Telephone extension from patrol box No. 125 for use of watchman at Chain Bridge.....	1

During the year a switchboard with 31 sets of instruments was installed in the new Central High School; also a switchboard with 17 sets of instruments was installed in the Dunbar School.

The following 10 telephones on these switchboards were discontinued during the year:

## District building:

Offices of the Public Utilities Commission, room 5.....	1
Offices of the Permit Clerk, extension, room 102.....	1

## Public schools:

Park View School.....	1
Old M Street High School.....	3
Miner Normal School.....	1
Slater School.....	1
Old Central High School.....	1
McCormick School.....	1

Franklin School switchboard: Two telephones, Franklin School building, were added to this switchboard during the year.

Fire department switchboard: Four telephones, two in No. 28 engine house, one in the office of the chief engineer, and one in No. 1 truck company quarters, were added to this switchboard during the year.

Police department switchboard: Four telephones, one (extension) in room 215, District building, one at the Highway Bridge, and two at residences 2829 Sixteenth Street NW. and 1624 Crescent Place NW., were added to this switchboard during the year; two telephones, 2829 Sixteenth Street NW. and 1624 Crescent Place NW., were discontinued during the year.

*Number of telephones connected to the District system July 1, 1917.*

Offices in the District building.....	182
Outside offices and institutions.....	89
Residences.....	3
Public schools.....	208
Fire department.....	66
Police department.....	52
Franklin School, private branch exchange.....	30
Water department, private branch exchange.....	32
Western High School, private branch exchange.....	17
McKinley Manual Training School, private branch exchange.....	15
James Ormand Wilson Normal School, private branch exchange.....	29
Miner Normal School, private branch exchange.....	12
New Central High School, private branch exchange.....	31
Dunbar High School, private branch exchange.....	18
Washington Asylum and Jail, private branch exchange.....	17
Police patrol service.....	42
Total.....	1,211

There are 27 portable telephone sets in service, the property of the District of Columbia. These instruments are used by the fire department and the employees of the electrical department.

## STORAGE-BATTERY SYSTEM.

The number of cells of storage battery in service July 1, 1917, was as follows:	
On fire-alarm circuits.....	1,862
On patrol circuits.....	226
On local circuits.....	86
Total.....	2,174

## DISTRICT UNDERGROUND CONDUIT AND CABLE SYSTEM.

The following conduit connections were made to the underground system:

*Fire-alarm posts (total, 18).*

Iowa Circle, between Thirteenth Street and Vermont Avenue NW.	Twelfth and Franklin Streets NE.
Sixteenth and G Streets NW.	Twelfth Street and Rhode Island Avenue NE.
Fourteenth Street and Columbia Road NW.	Twelfth and Irving Streets NE.
Fourteenth and G Streets SE.	Tenth and Kearny Streets NE.
Sixteenth and C Streets SE.	Seventeenth and Irving Streets NE.
Ninth and D Streets NE.	Twenty-fourth and Douglas Streets NE.
Thirteenth and E Streets NE.	Twenty-fourth and Franklin Streets NE.
Montello Avenue and Oates Street NE.	Thirty-fifth and 44 Streets NW.
Ninth and B Streets NW.	Pock Creek Church Road and Upshur Street NW.

*Police patrol posts (total, 19).*

Second and Upshur Streets NW.	Eleventh and F Streets, NW.
E Street between Fourteenth and Fifteenth Streets NW.	Fourteenth and G Streets, NW.
Thirteenth and C Streets SE.	Fourteenth and H Streets, NW.
Sixteenth and C Streets SE.	Ninth and F Streets, NW.
Montello Avenue and Oates Street NE.	Seventh and G Streets, NW.
Twelfth and Franklin Streets NE.	Eighteenth and Irving Streets, NW.
Twelfth and Monroe Streets NE.	First Street between E and F Streets NW.
Seventeenth and Irving Streets, NE.	Delaware Avenue and C Street, NE.
Twenty-fourth and Douglas Streets, NE.	Eleventh Street and South Carolina Avenue, SE.
Sixteenth Street between Land M Streets, NW.	

*Connections to buildings (total, 12).*

Garrison School, Twelfth Street between P and S Streets NW.	No. 17 Engine House, Monroe Street between Twelfth and Thirteenth Streets NE.
New Park View School, Warder Street between Newton and Otis Streets NW.	No. 26 Engine House, Twenty-second Street, Langdon.
New Central High School, Clifton Street between Eleventh and Thirteenth Streets NW.	Playgrounds, Eighteenth and C Streets, NW.
Payne School, Fifteenth and C Streets SE.	Playgrounds, Park Road between Fourteenth Street and Holmead Place, NW.
Wheatley School, Twelfth and N Streets NE.	Playgrounds, Second Street and Virginia Avenue SE.
St. John's Orphanage, Twentieth and F Streets NW.	
Poli's Theater, Fifteenth and E Streets NW.	

*Conduit extensions (total, 11).*

Twenty-eighth and M Streets NW.	Ninth and G Streets NW.
Thirteenth and C Streets NW.	Fourteenth and U Streets NW. (2 conduit extensions).
Fifteenth and G Streets NW.	North Capitol and H Streets NE.
N and Kirby Streets NW.	Eighth Street and Pennsylvania Avenue SE.
Twelfth Street and Ohio Avenue NW.	
Ninth and F Streets NW.	

In making the above-mentioned connections and extensions, 11,942<sup>1</sup> feet of conduit (duct feet) and 22 manholes were built, the work being done by this department.

*Connections to the underground system, July 1, 1917.*

Fire-alarm posts.....	1 424
Police patrol posts.....	339
Cable terminal posts.....	6
Schoolhouses.....	76
Fire department houses.....	33
Police station houses.....	13
Miscellaneous District buildings.....	16
United States Government buildings.....	25
Private buildings.....	60
Cable poles.....	64
Total.....	1,056

**POLICE PATROL SYSTEM.**

The following changes and new installations were made in the patrol system:

*First precinct.*—New installation, connected underground: Box No. 11, Fourteenth and G Streets NW.; box No. 29, Seventh and G Streets NW. Changed from overhead to underground connection: Box No. 13, E Street between Fourteenth and Fifteenth Streets NW.

*Second precinct.*—New installation, connected underground: Box No. 20, Department of Justice.

*Third precinct.*—New installation, connected underground: Box No. 11, Pan-American Union Building.

*Fourth precinct.*—New installation, connected underground: Box No. 20, Department of Agriculture. Changed from overhead to underground connection: Box No. 22, Sixth and K Streets SW.

*Fifth precinct.*—New installation, connected underground: Box No. 47, United States Navy Yard; box No. 48, Eleventh Street and South Carolina Avenue SE. Changed from overhead to underground connection: Box No. 22, Seventeenth and E Streets SE.; box No. 27, Twelfth and I Streets SE.

*Ninth precinct.*—Changed from overhead to underground connection: Box No. 42, Fourteenth and E Streets NE.

<sup>1</sup> One of these posts carries a private fire-alarm box.

*Tenth precinct.*—Changed from overhead to underground connection: Box No. 14, Eighth and Kennedy Streets NW.; box No. 54, Second and Upshur Streets NW.

*Subprecinct, Tenleytown.*—New installation, connected underground: Box No. 14, Connecticut Avenue and Pierce Mill Road NW.

On July 1, 1917, the distribution of boxes among the precincts was as follows:

	Wall boxes.		
	Under-ground.	Over-head.	Booths. Total.
First.....	34	.....	34
Second.....	27	.....	27
Third.....	47	.....	47
Fourth.....	36	2	38
Fifth.....	40	3	43
Sixth.....	26	.....	26
Seventh.....	22	3	25
Eighth.....	25	.....	25
Ninth.....	30	20	50
Tenth.....	44	13	58
Eleventh.....	.....	35	1
Subprecinct, Tenleytown.....	9	18	1
Total.....	1340	94	3 457

<sup>1</sup> Six of these boxes at following locations are not on posts: 3, Union Station; 1, Engineer stables, First and Canal Streets; 1, Takoma Park, watchbox; 1, Treasury Department.

#### FIRE-ALARM SYSTEM.

Twelve new fire-alarm boxes were placed in service during the year—10 public and 2 private—located as follows:

##### *Public boxes.*

No. 289, Iowa Circle between Thirteenth Street and Vermont Avenue NW.  
 No. 726, Thirty-fifth and R Streets NW.  
 No. 798, Broad Branch Road and McKinley Street NW.  
 No. 948, Fourth and Portland Streets SW.  
 No. 6118, Ninth and D Streets NE.  
 No. 6119, Thirteenth and E Streets NE.  
 No. 6181, Tenth and Jackson Streets NE.  
 No. 6182, Twelfth Street and Rhode Island Avenue NE.  
 No. 8122, Fourteenth Street and Columbia Road NW.  
 No. 8128, Rock Creek Church Road and Upshur Street NW.

##### *Private boxes.*

No. 344, St. John's Orphanage, Twentieth and F Streets NW.  
 No. 949, Chemical Products Co., Giesboro Road and Nichols Avenue SE.  
 One private box, No. 177, was discontinued during the year. This box was located at the old Emergency Hospital, Fifteenth Street and Ohio Avenue NW.  
 During the year nine fire-alarm boxes were changed from overhead to underground connection.

#### *Fire-alarm boxes in service.*

	July 1, 1916.	July 1, 1917.
Connected by overhead wires:		
Public boxes.....	75	70
Private boxes.....	21	20
Connected by underground wires:		
Public boxes.....	397	412
Private boxes.....	100	102
Total.....	593	604

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 167

## Alarms received and transmitted:

Regular box alarms.....	668
Alarms from telephone stations.....	4
Local alarms.....	827
Second alarms.....	8
Third alarms.....	0
Fourth alarms.....	0
Fifth alarms.....	0
Sixth alarms.....	0
Total.....	1,507
False box alarms.....	86
False local alarms.....	21

Each fire-alarm box was tested several times during the year, the contact points cleared, and the mechanism thoroughly overhauled. This is done regularly once a month as far as possible. The total number of tests amounted to 4,977, being an average of 8.24 per box.

*Alarms received by the month.*

Month.	Box.		Local	
	Number.	False.	Number.	False.
1916.				
July.....	35	3	26	4
August.....	40	10	24	—
September.....	40	6	37	3
October.....	51	9	59	1
November.....	74	12	87	2
December.....	75	12	91	2
1917.				
January.....	64	5	67	1
February.....	72	3	103	1
March.....	63	10	106	3
April.....	76	11	111	2
May.....	50	2	81	2
June.....	32	3	35	—
Total.....	672	86	827	21

**POLES.**

Under the authority of the act of Congress approved June 30, 1902, regulating the use of telephone wires in the District of Columbia, the Chesapeake & Potomac Telephone Co. has reported the following amount of work done during the fiscal year:

## Poles erected in alleys within the prescribed area:

Line.....	21
Guy.....	5
Anchors.....	10

## Anchors..... 36

## Poles erected in streets outside the prescribed area:

Line.....	93
Guy.....	13
Anchors.....	41

## Anchors..... 147

## Poles erected in alleys outside the prescribed area:

Line.....	125
Guy.....	18
Anchors.....	53

## Anchors..... 196

## Total..... 379

## Poles taken down in alleys within the prescribed area:

Line.....	9
Guy.....	2
Anchors.....	2

## Anchors..... 13

## Poles taken down in streets outside the prescribed area:

Line.....	40
Guy.....	6
Anchors.....	1
	47
Poles taken down in alleys outside the prescribed area:	
Line.....	12
Guy.....	5
Anchors.....	9
	26
Total.....	86
Total erected during the year.....	379
Total taken down during the year.....	86
Net increase.....	293

*Miscellaneous pole work—Poles erected, taken down, moved, etc.*

	Erected.			Taken down.			Moved.			Replaced.			Reset.			Increase.			Decrease.		
	Line.	Guy.	Anchor.	Line.	Guy.	Anchor.	Line.	Guy.	Anchor.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.	Line.	Guy.		
Chesapeake & Potomac Telephone Co.....	239	36	104	61	13	12	34	1	172	14	41	178	23	1	1	1	1	1	1		
Potomac Electric Power Co.....	301	35	127	5	2	6	31	1	104	3	3	296	33	1	1	1	1	1	1		
Western Union Telegraph Co.....			1							1											
District of Columbia.....			8	1						17	1						8		1		
Postal Telegraph-Cable Co.....			1							3	1								1		
Capital Traction Co.....										10											
City & Suburban Ry. Co.....			1							10											
Columbia Ry. Co.....																					
Georgetown & Tenleytown Ry. Co.....																					
Washington Interurban Ry. Co.....										1	10										
East Washington Heights Traction Railroad Co.....	4			2						51						2					
Brightwood Railway Co.....												1									
Anacostia & Potomac Ry. Co.....											68										
Total.....	545	71	231	78	16	18	65	3	451	19	44	477	56	10	1						

*List of poles of all kinds, July 1, 1917.*

	Line.	Guy.	Total.
District of Columbia.....	460	13	473
United States Government.....	297	1	298
Chesapeake & Potomac Telephone Co.....	6,356	666	7,022
Potomac Electric Power Co.....	6,232	227	6,519
Western Union Telegraph Co.....	908		908
Postal Telegraph-Cable Co.....	355	9	364
Baltimore and Washington Transit Co.....	30		30
Capital Traction Co.....	204		204
City and Suburban Ry. Co.....	86		86
Washington & Great Falls R. R. Co.....	401	1	402
Columbia Ry. Co.....	462	4	466
Steam railroads.....	545		545
Washington & Maryland Ry. Co.....	158		158
Georgetown & Tenleytown Ry. Co.....	304		304
Washington Interurban R. R. Co.....	187	4	191
East Washington Heights Traction R. R. Co.....	65		65
Brightwood Ry. Co.....	340		340
Anacostia & Potomac Ry. Co.....	3		3
Washington & Glen Echo Ry. Co.....	8		8
Capital Ry. Co.....	208		208
Total.....	17,669	925	18,594

## ELECTRIC-WIRING INSPECTION.

The following tables show the amount of work performed by this department in connection with the electrical-wiring inspection:

Permits issued by the inspector of buildings authorizing electrical wiring:

Buildings .....	1,020
Machinery .....	209
Signs .....	31
	<u>1,260</u>

Permits issued by the electrical department:

For inside electrical work .....	3,137
For outside electrical work .....	149
Temporary permits—	
Electric wiring .....	58
Use of current .....	220
Without fee (ordered by District of Columbia, etc.) .....	132
Building permits .....	1,370
Quarterly .....	23
Gas lamps, outside .....	73
	<u>5,162</u>

Certificates issued:

Final .....	3,068
Without fee .....	60
Preliminary .....	3
	<u>3,131</u>

Lamps and apparatus installed:

Incandescent .....	72,574
Arc lamps .....	17
Miscellaneous .....	4,908
Blank outlets .....	272
Motors .....	585
Total horsepower of motors .....	3,401
Generators .....	3
Total kilowatt capacity of generators .....	58
Defective wiring reported by inspectors .....	258
Notices of defective wiring sent .....	1,241
Requests for inspection .....	29
Miscellaneous .....	68
Cooking ranges, etc .....	16
Inspection in connection with yearly license .....	114

Fees paid to the collector of taxes:

For permits .....	\$5,577.00
For certificates .....	12.00
For 183 copies Rules and Regulations, at 30 cents each .....	54.90
	<u>5,643.90</u>

Rules and Regulations disposed of without fee .....

23

*Work of inspectors of electric wiring from July 1, 1916, to June 30, 1917.*

Inspections in private buildings .....	10,803
Inspections in municipal buildings .....	433
Inspections in theaters .....	628

Total inspections .....

11,864

## MISCELLANEOUS WORK.

This department prepared plans and specifications for and supervised the introduction of electric installation in the following municipal properties:

*Completed work.***Fire department:**

- No. 1 truck house, electric lighting system.
- No. 5 truck house, extension of electric lighting system.
- No. 6 truck house, electric lighting system.
- No. 2 engine house, extension to electric lighting system.
- No. 28 engine house, electric lighting system.

**Police department:**

- No. 1 station, repairs to electric lighting system.
- No. 1 station garage, electric lighting system.
- No. 4 station, repairs to electric lighting system.
- No. 5 station, repairs to electric lighting system.
- No. 9 station, electric lighting system.

**Board of education:**

- Park View School, complete electric wiring system.
- New Central High School, electric lighting and power system—supervision, inspection, and tests only.
- New Central High School, stage equipment; border light fixtures.
- New Central High School, motion-picture machine and wiring.
- Cleveland School, electric lighting fixtures.
- Jefferson School, stereopticon outlet.
- Armstrong Manual Training School, repairs to motor.
- Franklin School, alterations to fixture equipment.
- C. F. Powell School addition, electric lighting system.
- Dunbar High School, motion-picture machine and equipment.
- Dunbar High School, alterations to power panel.
- Dunbar High School, laboratory equipment.
- Dunbar High School, wiring for dish-washing machine and electric oven.
- Brookland School, stereopticon outlet.
- Miner Normal School, extension to electric lighting system.
- Western High School, laboratory generator.
- Western High School, extension to electric lighting system.
- J. O. Wilson School, electric wiring for dish-washing machine.
- J. O. Wilson School, moving-picture machine and booth equipment.

**Miscellaneous:**

- District Building, health office, repairs to electric oven.
- District repair shops, electric lighting system, electric fans, and adding machines.
- District workhouse, Occoquan, Pollock house, electric wiring and fixtures.
- District workhouse, temporary building, electric lighting system.
- District workhouse wharf, electric lighting system.
- Washington Asylum, superintendent's residence, electric lighting system.

*Work in progress.***Board of education:**

- Dunbar High School, electric lighting system.
- Elizabeth V. Brown School, electric lighting system.
- Miner Normal School, motion picture machine and equipment.
- New Central High School, motor-generator set.
- Garfield School, electric lighting system.

**Miscellaneous:**

- Street cleaning department shed, electric lighting system.
- Public Convenience Station No. 4 electric lighting system.

*Specifications prepared—work not started.*

- Municipal garage, electric lighting system.
- Municipal fish market, electric lighting system.
- Produce market shed, electric lighting system.
- Engineer of Highways property yard office electric air heater and wiring.
- McKinley School foundry, addition, extension of electric lighting system.
- New Central High School, motor-generator installation and panel.
- Petworth School, electric lighting system.
- Benning School, extension of electric lighting system.
- Cleveland School, stereopticon circuit.
- No. 22 engine house, electric lighting system.

## GENERAL SUPPLIES.

## Receipts.

Appropriation.....	\$11,050.00
Repayments.....	210.46
	<hr/>
	11,260.46

## Expenditures.

Office expenses.....	787.04
Telephone rental, etc.....	4,016.07
Instruments and apparatus.....	967.81
Cable.....	1,754.00
Labor pay roll.....	1,425.51
Storeroom expenses.....	33.68
Stable expenses.....	285.38
Wire.....	88.68
Line supplies.....	80.45
Tools and hardware.....	63.53
Batteries and battery supplies.....	853.37
Repairs to cuts.....	22.74
Paints.....	44.21
Car tickets.....	100.00
Traveling expenses.....	43.01
Cartage, freight and expressage.....	27.49
Conduit supplies.....	12.50
Underground supplies.....	41.82
Patterns.....	14.83
Maintenance of engineer stables.....	88.70
Miscellaneous.....	4.56
	<hr/>
	10,755.38

## LIGHTING.

## Receipts.

Appropriation.....	405,000.00
Repayments by Baltimore & Ohio Railroad Co.....	337.95
Repayments by Georgetown Barge, Dock, Elevator & R. R. Co.....	520.88
Repayments by Washington Terminal Co. <sup>1</sup> .....	3,797.31
Repayments by Philadelphia, Baltimore & Washington R. R. Co. <sup>1</sup> .....	5,682.55
Repayments, miscellaneous.....	11.55
	<hr/>
Total.....	415,350.24

## Expenditures.

Mantle gas lighting:	
Washington Gas Light Co.....	\$168,231.38
Deductions for defective service.....	68.82
	<hr/>
Georgetown Gas Light Co.....	10,448.44
Deductions for defective service.....	10.77
	<hr/>
Incandescent electric lighting:	
Potomac Electric Power Co.....	138,522.18
Deductions for defective service.....	883.69
	<hr/>
Electric arc lighting:	
Potomac Electric Power Co.....	62,097.40
Deductions for defective service.....	216.08
	<hr/>
	61,881.32

<sup>1</sup> Due but not paid.

## 172 OPERATIONS OF THE ENGINEER DEPARTMENT, D. C.

Street designation lighting:	
Washington Gas Light Co.....	\$3,664.42
Deductions for defective service.....	1.77
	-----
Georgetown Gas Light Co.....	249.07
Deductions for defective service.....	.26
	-----
Potomac Electric Power Co.....	952.39
Deductions for defective service.....	.79
	-----
Lamp-posts, globes, etc.....	961.60
Inspection of lamp-post castings.....	14,761.78
Street sign frames, etc.....	30.00
Erecting, moving, and taking down lamp-posts.....	212.79
Paints, oils, etc.....	424.50
Office expenses.....	194.24
Repairs to pavements.....	55.63
Stable expenses.....	50.68
Maintenance of engineer department stables.....	121.04
Rent of storeroom.....	100.00
Freight and expressage.....	780.00
Tools and hardware.....	11.88
Car tickets.....	10.87
Trimming trees.....	80.00
Investigating damage to lamp-posts.....	7.29
Labor pay roll.....	274.50
Storeroom expenses.....	4,130.00
Miscellaneous.....	41.00
	7.79
	-----
	404,277.18

## WIRES UNDERGROUND.

<i>Receipts.</i>	
Appropriation.....	\$7,000.00
Repayments.....	110.01
Total.....	7,110.01

*Expenditures.*

Cable.....	\$3,035.48
Underground supplies.....	1,485.31
Labor pay roll.....	1,175.90
Tools and hardware.....	77.89
Repairs to cuts.....	236.79
Lamp-posts for fire-alarm and police boxes.....	700.41
Wire.....	6.25
Maintenance of engineer stables.....	50.00
	-----
	6,768.03

## EXTENSION OF POLICE PATROL.

<i>Receipts.</i>	
Appropriation.....	\$2,500.00
Repayments.....	144.51
Total.....	2,644.51

*Expenditures.*

Cable.....	\$822.00
Underground supplies.....	285.64
Labor pay roll.....	415.70
Lamp-posts for police patrol boxes.....	401.50
Instruments and apparatus.....	219.00
Repairs to cuts.....	54.42
	-----
	2,198.26

## OPERATIONS OF THE ENGINEER DEPARTMENT, D. C. 173

## FIRE-ALARM BOXES.

*Receipts.*

Appropriation.....	\$2,000.00
Deficiency appropriation.....	500.00
Total.....	2,500.00

*Expenditures.*

Cable.....	\$822.00
Underground supplies.....	89.54
Labor pay roll.....	65.75
Instruments and apparatus.....	21.50
Fire-alarm boxes.....	1,250.00
Lamp-posts for fire-alarm boxes.....	117.00
Repairs to cuts.....	35.88
	2,401.67

## REPLACING POLICE PATROL SIGNALING SYSTEM.

*Receipts.*

Appropriation.....	\$6,324.00
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*Expenditures.*

Wire.....	\$374.00
Cable.....	84.00
Instruments and apparatus.....	611.00
	1,069.00

## REPORT OF THE CHIEF CLERK OF THE ENGINEER DEPARTMENT.

WASHINGTON, D. C., October 1, 1917.

SIR: I have the honor to submit the following report of the operations of this office for the fiscal year ended June 30, 1917:

Communications received, briefed, recorded, and indexed.....	13,059
Vouchers prepared and recorded.....	353
Contracts drawn and indexed.....	266
Bonds approved and indexed.....	368

The tables accompanying this report show statement of contracts entered into during the year.

Very respectfully,

DANIEL E. GARGES,  
Chief Clerk, Engineer Department.

ENGINEER COMMISSIONER DISTRICT OF COLUMBIA.

## STATEMENT OF CONTRACTS.

*Contracts entered into during the fiscal year 1917.*

## 1. HIGHWAY IMPROVEMENTS.

No.	Name of contractor.	Nature of contract.
6161	William F. Cush.....	Laying cement sidewalks.
6171	The Cranford Paving Co.....	Sheet asphalt pavements.
6172	Warren F. Brenizer Co.....	Grading and improving streets.
6178	Edward G. Gummel.....	Graveling Massachusetts Avenue, Nebraska Avenue to District line.
6181	Hoover & Hoover.....	Graveling To Id Place, Lincoln Road to Second Street.
6184	H. F. Voight Co.....	Gravel Franklin and Seventeenth Streets NE.
6185	Geo. Hyman.....	Gravel Rhode Island Avenue NE., South Dakota to District line.
6187	W. D. Murray & Co.....	Wall on Canal Road, between Aqueduct Bridge and Foundry Branch.

*Contracts entered into during the fiscal year 1917—Continued.*

## 1. HIGHWAY IMPROVEMENTS—Continued.

No.	Name of contractor.	Nature of contract.
6205	The Cranford Paving Co.....	Restoring street-railway tracks to grade, First Street east, from B Street north to B Street south.
6210	William F. Cush.....	Portland Street, Nichols Avenue SE. to Fourth SW., grading.
6215	Warren F. Brenizer Co.....	Grading Garret Place NE., Minnesota Avenue to Forty-second Street.
6218	G. B. Mullin Co.....	Grading Sixteenth Street NW., Montague Street to Alaska Avenue and New Hampshire Avenue.
6233	Washington Asphalt Block & Tile Co.	Paving B Street NW., Seventh to Twelfth Streets.
6261	Charles H. Tompkins.....	Viaduct in line of Sixteenth Street over Piney Branch.
6268	Washington Asphalt Block & Tile Co.	Paving various alleys.
6287	The H. F. Voight Co.....	Grading Eighth Street NW., Thornton Place NW., and Fourteenth Street NE.
6289	George Hyman.....	Grading Tracy Place NW.
6290	Washington Asphalt Block & Tile Co.	Asphalt block pavements.
6292	The Cranford Paving Co.....	Sheet asphalt pavements.
6293	Richard J. Beall.....	Platform and retaining wall, east end M Street Bridge across Rock Creek.
6295	G. B. Mullin Co.....	Grading Buchanan and Sixteenth Streets NW.
6311	Warren F. Brenizer Co.....	Cement roadway on Nichols Avenue SE., Fourth to Upsilon.
6312	Edward G. Gummel.....	Constructing bridges in line of Sixty-first Street NE.
6314	Warren F. Brenizer Co.....	Grading Alabama Avenue SE.
6315	.....do.....	Grading Forty-eighth Street NE.

## 2. SEWER CONSTRUCTION.

6161	Warren F. Brenizer Co.....	Extension, outlet—Easby Point high level interceptor.
6165	.....do.....	D Street trunk.
6168	Louis M. Johnston.....	K Street NW., Fourteenth to Fifteenth.
6180	Warren F. Brenizer Co.....	Portland Street.
6197	.....do.....	Pennsylvania Avenue SE., Twelfth to Fourteenth.
6198	.....do.....	Old Tiber Creek, between Pennsylvania Avenue and B Street south.
6199	.....do.....	Good Hope Run trunk.
6201	Louis M. Johnston.....	Fourteenth Street trunk.
6202	.....do.....	Mount Pleasant trunk.
6204	George Hyman.....	Rock Creek main interceptor, section 8.
6206	Warren F. Brenizer Co.....	Anacostia main interceptor, sections 7, 8, 9, and 10.
6209	.....do.....	B Street SW., Ninth to Twelfth Streets.
6223	.....do.....	Luzon Valley.
6234	W. H. H. Allen Construction Co.....	Georgia Avenue branch of Petworth trunk.
6235	.....do.....	Ellicott Street service.
6241	Louis Aiello & Son.....	Hillbrook service, section 4.
6260	.....do.....	Hillbrook and Kenilworth.
6265	Warren F. Brenizer Co.....	Burnt Bridge Run trunk.
6266	.....do.....	Piney Branch trunk.
6267	.....do.....	Pinehurst service.
6269	W. H. H. Allen Construction Co.....	Georgia Avenue trunk.
6281	Warren F. Brenizer Co.....	Upper Potomac interceptor.
6282	.....do.....	Storm-water basins, Portland Street, First Street to Nichols Avenue.
6291	W. H. H. Allen Construction Co.....	Dalecarlia interceptor.
6294	William F. Cush.....	Service, various locations.
6296	Warren F. Brenizer Co.....	Stickfoot branch trunk.
6297	.....do.....	Delafield Place trunk.
6310	Louis M. Johnston.....	James Creek Valley trunk.
6313	Warren F. Brenizer Co.....	Forty-ninth Street and Eads Place.

## 3. MATERIAL AND HAULING.

6060	Sun Co.....	Road oils.
6063	National Fire Proofing Co.....	Terra-cotta sewer pipe.
6065	Porter, McKown & McKown.....	Re-l sewer brick.
6067	Columbia Granite & Dressing Co.....	Sand and gravel.
6068	United States Asphalt Refining Co.....	Road oils.
6069	.....do.....	Asphalt paving cement.
6072	The Barrett Co.....	Road oil.
6077	Heiley Goo! Road Co.....	Do.
6094	The East Ohio Sewer Pipe Co.....	Terra-cotta sewer pipe, 1917.
6098	Standard Oil Co.....	Fuel oil.
6104	Central Foundry Co.....	Buffalo water service boxes.
6106	Baltimore Clay Products Co.....	Sewer invert brick.
6109	Washington Asphalt Block & Tile Co.	Asphalt paving block.
6111	Potomac River Clay Works.....	Terra-cotta pipe.
6119	Burr Bros.....	Hauling stone.

*Contracts entered into during the fiscal year 1917—Continued.*

3. MATERIAL AND HAULING—Continued.

No.	Name of contractor.	Nature of contract.
6123	Altavista Foundry Co.	Miscellaneous castings.
6130	Fred J. White.	Do.
6137	American Sewer Pipe Co.	Terra-cotta sewer pipe.
6138	The Barrett Co.	Paving pitch.
6140	Mary S. Mann.	Hauling for schools.
6141	Lynchburg Foundry Co.	Water pipe and specials.
6146	Harris Granite Quarries Co.	Granite curb.
6147	Mack Manufacturing Co.	Paving block.
6182	Glamorgan Pipe & Foundry Co.	Water pipe for reformatory.
6186	Thos. Somerville Co.	Galvanized iron nipples for water department.
6193	Nassau Smelting & Refining Works.	Pig lead.
6228	Baltimore Clay Product Co.	Vitrified paving block.
6229	Rosslyn Steel & Cement Co.	Reinforcing steel.
6243	North Carolina Granite Corporation.	Granite curb.
6271	Lewis E. Smoot.	Gravel.
6273	North Carolina Granite Corporation.	Granite curbing.
6280	Richmond Granite Co.	Furnishing granite curbing.
6288	National Mortar Co.	Portland cement.
6299	Chas. F. Miller Co.	Hauling broken stone, and sand and gravel.
6302	North Carolina Granite Corporation.	Granite curbing.
6305	Baltimore Clay Product Co.	Vitrified paving block.
6307	Hammond Byrd Iron Co.	Water pipe and specials.
6318	Morgantown Brick Co.	Vitrified sewer invert brick.
6319	J. M. Titcomb Co.	Hauling broken stone, sand, and gravel.

4. BUILDING AND BUILDING REPAIRS.

6116	Rudolph & West Co.	Repairing furnaces in schools.
6162	James B. Henderson Co.	Weather strips, Central High School.
6163	The Melton Construction Co.	Addition and alterations, Dunbar High School.
6213	William E. Mooney.	Conservatory, Dunbar High School.
6242	The Pierce Construction Co.	Central Garage.
6253	The Biggs Heating Co.	Engine House 26, heating system.
6254	.....do.....	Johnson School, heating system.
6255	.....do.....	Engine houses 6 and 7, heating systems.
6256	.....do.....	Police station No. 6, heating system.
6258	Warren, Moore & Co.	Construction of fish market.
6259	The Melton Construction Co.	Sheds for street cleaning department.
6264	Joseph H. Gibbons.	Garage for District of Columbia pound.
6275	William E. Mooney.	Miscellaneous work, Dunbar High School.
6276	The Melton Construction Co.	Addition and alterations, Elizabeth V. Brown School.
6306	Striker & Garrett	Sheds, farmers' market.

5. GENERAL SUPPLIES.

6061	A. G. Spaulding & Bros. (Inc.).	Gymnasium equipment.
6062	Dulin & Martin.	Furniture and hardware.
6064	The McKee Co.	Drugs.
6066	F. A. Denison Co.	Groceries.
6070	Mansfield-Sheaffer Paint & Glass Co.	Paints.
6071	Houghton Millin Co.	School books.
6073	Jas. B. Lambie Co.	Furniture, hardware, and plumbing material.
6074	Thos. W. Smith.	Lumber.
6075	R. P. Clarke Co.	Stationery, rubber stamps, and drugs.
6076	Interstate Chemical Co.	Paints.
6078	James F. Oyster.	Groceries.
6079	Fred A. Schmidt.	Stationery, hardware, and paints.
6081	Armour & Co.	Groceries and drugs.
6082	Warren Quinlan Asphalt Co.	Resurfacing asphalt pavements.
6084	L. G. Kelly Printing Co.	Printing, 1917.
6085	Wm. C. Robinson & Son Co.	Oils and lubricants.
6086	The Dulany-Vernay Co.	Stationery.
6087	Louis Hartig.	Furniture, hardware, and plumbing material.
6088	The Circle Tire Co.	Automobile supplies.
6089	R. Carter Ballantyne.	Stationery and schools books.
6090	Miller & Graham.	Paints and oils.
6091	Lutz & Co.	Saddlery.
6092	Mackall Bros.	Drugs.
6093	Crane Co.	Plumbing material.
6095	The Prang Co.	Stationery, paints, and kindergarten supplies.
6096	Doubleday-Hill Electric Co.	Electrical supplies.
6097	National Electrical Supply Co.	Hardware, electrical, and automobile supplies.
6099	Standard Oil Co.	Oils and lubricants.
6100	.....do.....	Gasoline.
6102	Morris & Co.	Groceries and drugs.

*Contracts entered into during the fiscal year, 1917—Continued.*

## 5. GENERAL SUPPLIES—Continued.

No.	Name of contractor.	Nature of contract.
6105	The Chew-Goucher Co.	Automobile supplies.
6107	W. M. Galt & Co.	Forage.
6108	Globe-Wernicke Co.	Stationery and furniture.
6110	Jos. Dixon Crucible Co.	Stationery.
6112	Thos. Somerville Co.	Hardware and plumbing material.
6113	Martin Wiegand.	Furniture and lumber.
6114	Hugh Reilly Co.	Paints and oils.
6115	Rudolph & West Co.	Hardware, plumbing material, and paints.
6117	Marvin S. Young Co.	Printing, 1917.
6118	B. F. Goodrich Co.	Plumbing material.
6120	Chas. G. Stott & Co.	Stationery.
6121	Geo. F. Muth & Co.	Stationery, hardware, and groceries.
6122	Carroll Electric Co.	Hardware and electrical supplies.
6124	Lewis Flemer.	Drugs.
6125	W. A. Smoot & Co.	Fuel.
6126	Wilkins-Rogers Milling Co.	Forage.
6127	Walter H. Mallon.	Fuel.
6129	Guy, Curran & Co.	Groceries, shoes, and drugs.
6131	Geo. M. Oyster, Jr.	Milk and cream.
6132	Commercial Coal Co.	Fuel.
6134	Milton Bradley Co.	Stationery, school books, and hardware.
6135	J. Edward Chapman.	Fuel.
6136	Swinhart Sales Co.	Automobile supplies.
6142	Frank G. Stewart.	Do.
6143	Ward W. Griffith.	Fuel.
6144	Z. D. Gilman.	Drugs.
6145	Chas. H. Javins Sons.	Meats.
6148	Chesley & Harvey cutter.	Automobile supplies.
6150	R. Carter Ballantyne.	School paper.
6151	Dulin & Martin.	Toilet paper.
6152	John P. Agnew & Co.	Fuel.
6153	Chas. G. Stott & Co.	Stationery.
6157	Mathers-Lamm Paper Co.	Do.
6167	The Texas Co.	Gasoline.
6169	J. H. Weil & Co.	Paper pads.
6173	R. P. Andrews Paper Co.	Toilet paper.
6174	W. M. Galt & Co.	Forage.
6175	Wilkins-Rogers Milling Co.	Do.
6179	Washburn-Crosby Co.	Do.
6183	W. S. Hoge & Bro.	Do.
6189	American Book Co.	Music books.
6191	McDowell & Sons.	Forage.
6207	Orenda Coal Co.	Coal.
6214	do.	Do.
6216	Standard Oil Co.	Gasoline.
6217	John P. Agnew & Co.	Coal.
6221	R. Carter Ballantyne.	American histories.
6227	John P. Agnew & Co.	Coal.
6240	Orenda Coal Co.	Do.
6250	L. E. White Coal Co.	Do.
6272	Clark & Co.	Groceries.
6277	Orenda Coal Co.	Coal.
6279	J. Maury Dove Co.	Do.
6316	General Baking Co.	Groceries.
6320	W. M. Galt & Co.	Forage.
6321	Theo. H. Kromm & Sons.	Saddlery.
6322	Washburn-Crosby Co.	Forage.
6323	Max Frank.	Saddlery.
6325	C. M. Woolf & Co.	Do.

## 6. MISCELLANEOUS.

6080	Lewis Hopfenmaier.	Purchase old material.
6083	The Flour City Ornamental Iron Co.	Bronze lamp-posts.
6101	David Notes.	Auctioneer services.
6103	Walter F. Owens.	Collecting refuse from markets.
6128	American Electrical Works.	Underground cable.
6133	The United States Blackboard Co.	Blackboard, Dunbar High School.
6139	White House Lunch Co.	Sandwiches and coffee, police court.
6149	F. F. Droop & Sons Co.	Pianos, Dunbar High School.
6154	Wm. H. McCray.	Steps in Garfield Park.
6155	The Elmer H. Catlin Co.	Lighting fixtures, Dunbar High School.
6156	Abraham Baldwin (Inc.).	Prison cloth for workhouse.
6158	W. B. Moses & Sons (Inc.).	Curtains, Dunbar High School.
6159	do.	Stage and other curtains.
6160	Standard Electric Co.	Clock and bell system, Dunbar High School.
6166	A. Rice Son & Co.	Horses for fire department.

*Contracts entered into during the fiscal year, 1917—Continued.*

## 6. MISCELLANEOUS—Continued.

No.	Name of contractor.	Nature of contract.
6170	Acme Burlap Bag Co. ....	Sacks for street-cleaning division.
6176	The Gamewell Fire-Alarm Telegraph Co. ....	Fire-alarm boxes.
6177	Barnhart Bros. & Spindler. ....	Printing office, Dunbar High School.
6188	Alexandria Iron Works. ....	Dunbar High School, wireless masts; Western High School, wireless masts, steps, and fence.
6190	Chester Henry Warrington. ....	Touring car for assessor's office.
6192	The C. D. Pruden Co. ....	Steel cottages, Tuberculosis Hospital.
6194	Acme Burlap Co. ....	Sacks for street-cleaning division.
6195	Rudolph & West Co. ....	Galvanized-iron fencing for street-cleaning division.
6196	Harper-Overland Co. ....	Automobiles.
6200	Foran Foundry Manufacturing Co. ....	Lamp-posts.
6203	Brockway Motor Truck Co. ....	Motor-truck chassis.
6208	International Motor Co. ....	Flusher for street-cleaning department.
6211	The A. P. Smith Manufacturing Co. ....	Brass curb cocks.
6212	The Central Foundry Co. ....	Lamp-posts and accessories.
6219	American Laundry Machinery Co. ....	Laundry equipment for workhouse.
6220	Eureka Fire Hose Manufacturing Co. ....	Fire hose.
6222	Baltimore Enamel & Novelty Co. ....	Automobile identification number tags.
6224	L. G. Kelly Printing Co. ....	Printing tax-list delinquents.
6225	L. Wolf Manufacturing Co. ....	Furnishing urinals.
6226	.... do. ....	Furnishing water-closets.
6230	McIntosh Battery Optical Co. ....	X-ray machine and apparatus.
6231	J. Rush Marshall. ....	Plans and specifications for school building, Eighteenth, Twentieth, Monroe, and Newton Streets N.E.
6232	George Oakley Totten, jr. ....	Plans, etc., for Calvert Street Bridge.
6236	The R. U. V. Co. ....	Filtering and sterilizing system, swimming pool for Dunbar High School.
6237	Fitzhenry-Guptill Co. ....	2 tree sprayers.
6238	Front Drive Motor Co. ....	Motor fire apparatus.
6239	Commercial Garage. ....	1-ton truck for water department.
6241	Aumen Machinery Co. ....	Drill and shaper for repair shop.
6245	Arthur H. Bryant. ....	Purchase oyster shells.
6246	Lippard-Stewart Motor Car Co. ....	Motor truck.
6247	.... do. ....	Do.
6248	Carrol Electric Co. ....	Fan and engine, Business High School.
6249	D. B. Gish (Inc.). ....	6 automobiles.
6251	The Gamewell Fire Alarm Telegraph Co. ....	Furnishing fire alarm boxes.
6252	Duhrkop Oven Co. ....	Bakery equipment, District of Columbia Reformatory.
6257	Baltimore Enamel & Novelty Co. ....	Automobile identification tags.
6262	Aumen Machinery Co. ....	Radical drill for fire department.
6263	.... do. ....	Lathe for repair shop.
6270	F. G. Smith Piano Co. ....	Pianos for schools.
6274	Charles H. Ehrhardt. ....	Repairing school playground equipment.
6278	Automatic Refrigerating Co. ....	Refrigerating plant, workhouse, Occoquan.
6283	Olmsted Bros. ....	Architectural service, etc., improvement Rock Creek Park.
6284	Heine Safety Boiler Co. ....	Boilers central power plant, reformatory and workhouse.
6285	Worthington Pump & Machinery Co. ....	Water meters.
6286	American-La France Fire Engine Co. ....	Gasoline engine for fire department.
6288	James E. Douglass. ....	Two auto trucks for workhouse.
6300	Warner Stutler. ....	Removing ashes and refuse from District of Columbia buildings.
6301	Brockway Motor Truck Co. ....	Tractor for street-cleaning division.
6303	H. R. Heineicke (Inc.). ....	Brick stack, central power plant, Occoquan.
6304	Cartercar Sales Co. ....	1 chassis and 2 trucks for water department.
6308	Ohio Tinner Co. ....	3 motor truck trailers for workhouse.
6309	National Brass & Copper Tube Co. ....	Signal and telephone cable.
6317	White House Lunch. ....	Sandwiches and coffee, police court.
6324	L. G. Kelly Printing Co. ....	Printing.
6326	Brockway Motor Truck Co. ....	Squeegee machine, street cleaning department.

## REPORT OF THE WHARF COMMITTEE.

WASHINGTON, September 12, 1917.

SIR: The wharf committee has the honor to submit the following report of its operations for the fiscal year ended June 30, 1917.

Accompanying is a list of wharf property now under lease on the Potomac River, the Anacostia River or Eastern Branch, and James Creek Canal.

The rentals received from Potomac River wharves for the fiscal year 1917 was \$15,982: from the Anacostia River, \$584.25; and from the James Creek Canal, \$793.70.

**AVAILABLE WATER FRONTAGE.**

The actual water frontage in the District of Columbia, with the exception of canals devoted to commerce, is about 2 miles. The total available water frontage, exclusive of canals, which is practicable of commercial development, is about 18 miles; this frontage, however, includes the portion set apart for parks and purposes of the United States, about 8 miles.

**WHARVES ALONG THE WASHINGTON CHANNEL.**

The largest amount of wharf property is that along the Washington Channel. This has a total frontage on the city side of 9,275 linear feet, of which 4,675 linear feet, between the grounds of the War College and the south curb line of N Street, is under the jurisdiction of the Chief of Engineers, United States Army, and of the remaining 4,600 feet, between the south curb line of N Street south and Fourteenth Street SW., 4,021 feet is under the jurisdiction of the Commissioners of the District of Columbia, and 559 feet, between Thirteenth and Fourteenth Streets, is under the jurisdiction of the United States.

The leases for these wharves are generally for a period of five years, expiring March 15, 1918. The basis of rental is a net return of 4 per cent on the estimated value of the wharf property, with the requirement that the lessee shall make improvements and repairs. No appropriation has been made for a general improvement of the water frontage, but three new fish wharves and a wharf for a District property yard have been constructed, and an appropriation has been made for constructing a new wharf at the foot of M Street SW. The wharf property generally is in bad condition and deteriorating rapidly, so that appropriations should be made each year to remove the old wharves and construct new and modern wharves in their place.

Along the frontage are located the harbor police station, the dock of the harbor boat, the house and dock of the fire boat, the District morgue, a District property yard, and the municipal fish wharf and market.

**WHARVES ALONG THE ANACOSTIA RIVER.**

There are only four leases for wharves along the Anacostia River. The United States Navy Yard has been extended so as to require the revocation of leases formerly made for wharf property at the foot of Fourth Street SE. and water frontage of Potomac Avenue between Third and Fourth Streets SE. The water frontage available for commercial purposes along this river is very much restricted, due to the occupation of the navy yard, and also to the proposed Anacostia Park running eastward from the navy-yard bridge.

**WHARVES ALONG THE GEORGETOWN CHANNEL.**

All the wharf property along this frontage is under private control with the exception of the foot of streets. Two leases have been entered into with private parties—one for the foot of Thirty-third Street, and the other for the foot of G Street NW.

**JAMES CREEK CANAL.**

On account of the construction of a sewer along the east bank of James Creek Canal from N to P Streets, lessees along this portion of the canal have been notified that their leases will not be extended in any case after October 1, 1917. Two leases have been made, however, for water frontage south of P Street, and the Washington Brick & Terra Cotta Co., occupying a frontage on the west side of the canal between O and P Streets, has not yet vacated.

DANIEL E. CARGES, *Chairman.*  
D. E. McCOMB,  
RUSSELL DEAN,

*Wharf Committee.*

The ENGINEER COMMISSIONER.

*List of wharf property under lease Oct. 1, 1917.*

POTOMAC RIVER FRONT.

Name of lessee.	Location.	Expires.	Water frontage.	Area.	Rental per year.
			<i>Lin.ft.</i>	<i>Sq.ft.</i>	
			40	2,400	\$85.00
R. M. Allen .....	Sec. 2, structures 39 and 40, foot of Ninth Street SW.	Mar. 15, 1918	40	2,400	\$85.00
Capital Yacht Club .....	Foot of Ninth Street SW., between structures 39 and 41.	June 30, 1918	24	2,080	75.00
L. A. Clarke & Son .....	Sec. 2, structures 68 to 77, including 70½ feet Tenth Street SW.	Aug. 1, 1918	280	45,000	1,900.00
Colonial Beach Co. ....	Sec. 1, structures 31 to 37, inclusive, Water Street, between M and N Streets.	Mar. 15, 1918	132	8,000	500.00
Cranford Paving Co. ....	Foot of Thirty-first Street NW.....	Feb. 1, 1918	53	.....	240.00
J. Maury Dove Co. (Inc.) .....	Sec. 3, structures 12 to 20, foot of Thirteenth Street SW.	Monthly.....	168	38,000	1,570.00
Do.....	Foot of G Street NW.....	do.....	100	.....	120.00
G. W. Forsberg.....	Sec. 2, structures 22 to 33, inclusive, except 24, foot of Eighth Street SW.	Mar. 15, 1918	156	18,000	733.00
W. E. Garner.....	Sec. 2, structures 36, 37, and 38, foot of Ninth Street SW.	do.....	44	3,320	130.00
E. Madison Hall....	Sec. 1, structures 26 to 30, inclusive, foot of N Street SW.	Sept. 30, 1917	120	7,000	460.00
Wm. C. Hamburg .....	See. 3, structure 23, foot of Thirteenth Street SW.	Apr. 15, 1918	18	1,440	60.00
ohnson & Wimsatt .....	Sec. 3, structures 5 to 11, inclusive, foot of Twelfth Street SW.	Mar. 15, 1918	190	43,500	2,244.00
Mount Vernon and Marshall Hall Steamboat Co. ....	Sec. 1, structures 59, 62, 63, and 64, foot of M Street SW.	do.....	125	10,000	600.00
Norfolk & Washington Steamboat Co. ....	Sec. 1, structures 60 and 65 to 72, inclusive, foot of Seventh Street SW.	Dec. 31, 1921	190	35,600	2,447.00
Potomac & Chesapeake Steamboat Co. ....	Sec. 2, structures 11 to 21, inclusive, foot of Eighth Street SW.	Mar. 15, 1918	198	35,600	1,596.00
Wm. A. Ragan .....	Sec. 3, structure 22, foot of Thirteenth Street SW.	do.....	65	4,200	100.00
Jos. P. Stephenson, Stephenson & Bro. ....	Sec. 2, structures 1 to 10, inclusive, foot of Seventh Street SW.	Jan. 31, 1922	300	59,900	2,402.00
Wimsatt & Church .....	Sec. 2, structures 34 and 35, foot of Ninth Street SW.	Mar. 15, 1918	80	18,000	720.00
District of Columbia:					
Municipal fish wharf and market. ....	Sec. 2, structures 78 to 82, inclusive, and 85 to 97, inclusive, structures 98 to 129, inclusive.	.....	700	152,100	.....
Do.....	Sec. 3, structures 1 to 4, inclusive, Water Street between Tenth and Twelfth Streets SW.	.....	126	11,015	.....
Property yard .....	All water frontage on Water Street between H and I Streets SW.	.....	503	96,370	.....
Fire-boat wharf. ....	Sec. 1, structures 39 and 40, Water Street between N and M Streets.	.....	.....	.....	.....
Morgue.....	Sec. 1, structures 41 and 42, Water Street, between N and M Streets.	.....	.....	.....	.....
Harbor master's wharf. ....	Sec. 1, structure 38, and sec. 2, slip between structures 41 and 42.	.....	.....	.....	.....
United States site of central heat and power plant. ....	Water Street, between Thirteen-and-a-half and Fourteenth Streets SW.	.....	359	38,975	.....
Do.....	Sec. 3, structures 24 to 27, inclusive, foot of Thirteenth Street SW.	.....	200	26,600	.....
Total.....					15,982.00

*List of wharf property under lease Oct. 1, 1917—Continued.*

ANACOSTIA RIVER FRONT (EASTERN BRANCH).

Name of lessee.	Location.	Expires.	Water frontage.	Rental per year.
Harry D. Bailey.....	North side just west of Anacostia Bridge to west abutment wall of old Anacostia Bridge.	Oct. 18, 1917	<i>Lin. ft.</i> 81	\$100.00
Edward S. Dean.....	Water front between the lines of N Street SE.	Monthly.....		67.50
Eastern Power Boat Club.....	Directly west of the west abutment of the old Anacostia Bridge.	June 30, 1918	93	162.75
Standard Oil Co.....	Water front between building lines of Q Street SE.	Dec. 31, 1921		255.00
District of Columbia sewer division.	Foot of First Street SE., opposite lot 1, square south of square 744.		330	.....
United States Superintendent of Capitol Buildings and Grounds.	Foot of First Street SE., opposite square south of square 744.		40	.....
Total.....				584.25

JAMES CREEK CANAL BETWEEN N STREET AND THE ANACOSTIA RIVER.

Name of lessee.	Designation.	Water frontage.	Rental per year.
Henry Raum.....	Part of parcel No. 31.....	<i>Lin. ft.</i> 50	\$25.00
William Rentz.....	Parcel 32.....	70	36.00
Washington Brick & Terra Cotta Co.....	Parcels Nos. 2 and 10.....	570	427.50
Total.....			488.50

REPORT OF THE ASSISTANT ENGINEER IN CHARGE OF ROCK CREEK PARK.

WASHINGTON, D. C., September 24, 1917.

The annual appropriation for the care and improvement of the park was \$22,000. An itemized statement of the expenditure is given below:

Job. No.	Work.	Labor.	Material.	Cost.
2600	General repair and care.....	\$10,655.27	\$313.25	\$10,968.52
2601	Farming.....	459.92	.....	459.42
2602	.....			
2604	Oiling.....	901.62	766.86	1,668.48
2609	.....			
2603	Piney Branch Parkway.....	801.12	.....	801.12
2605	Clearing and cutting dead timber.....	1,574.75	.....	1,574.75
2606	Drinking fountains.....	50.39	60.83	111.22
2607	Hauling stone.....	17.00	.....	17.00
.....	Preparation of plans for development of park.....	60.00	.....	60.00
.....	Contract with Olmsted Bros. for same.....	3,000.00	.....	3,000.00
.....	Construction of sewer to superintendent's house.....	500.00	.....	500.00
.....	Stone purchased.....	.....	.....	1,298.21
.....	Hauling same under contract.....	.....	.....	348.57
.....	Equipment.....	.....	.....	317.66
.....	Blacksmithing.....	.....	.....	344.97
.....	Forage.....	.....	.....	406.68
.....	Tools and implements.....	.....	.....	108.40
.....	Unexpended balance.....	.....	.....	15.00
	Total.....			22,000.00

No new construction was undertaken during the year, except to widen Beach Driveway for a total length of about 1,500 feet above and below the Boulder Bridge, where it was formerly so narrow as to considerably restrict the speed and endanger the safety of vehicles and passengers when traffic was heavy.

Stone was purchased and hauled for the construction of a new driveway across the park on the approximate line of Rittenhouse Street, but the final location of the roadway will be determined only after the completion of a general plan for improvement of the park now in the course of preparation.

A contract was made with Olmsted Bros., Brookline, Mass., for the preparation of a general plan of improvement of the park, and they were furnished with a large scale map, prepared by this office and containing various suggestions, and with a number of prints of the large scale map.

Most of the roads were oiled and sanded during the year at a cost of \$1,668.48.

The Beach Driveway was closed to traffic for a large part of the year during the construction of a trunk sewer along the creek between Boulder Bridge and the Military Road.

The expenditure for general care and maintenance of the park was about \$11,000 including the upkeep of roads, bridle and foot paths; placing cement floors in temporary toilets and stone floors in the bath houses; construction of benches, tables, and a stone field oven; widening the Beach Driveway; placing a new roof on the Pierce Mill; installing water and telephone in the Pierce Mill; cutting grass, and in the general care and maintenance of the grounds.

The clearing up of undergrowth and dead and fallen timber was accomplished over a considerable area; but a large amount of such work still remains to be accomplished. This work cost for labor \$1,574.75, not including the cost of the park teams, and was done mostly in the winter time. Such work is very necessary for the prevention of fires. About 200 cords of wood were sold to the public schools.

Farming operations on a sufficient scale to produce most of the feed required for the park teams were carried on at a cost, for hired labor, of \$459.42.

During the year ending June 30, 1918, it is proposed to repair and reopen the Beach Driveway below Military Road. Upon the adoption of the general plan now being prepared, work will proceed in accordance therewith upon the construction of one or more driveways crossing the park from east to west. Work upon the clearing of underbrush and undesirable trees from the wooded areas will be continued.

It is found that the detail of two mounted police, now assigned to patrol the park for a portion of the day, is not able, owing to the large increase in the number of those frequenting the park, to entirely prevent violation of regulations, to maintain order at the swimming pools, and to enforce traffic regulations; and it is recommended either that two additional men be detailed for this purpose or that two park watchmen be employed, to be paid from the appropriation for care and improvement of the park. Through much of the year provision must be made for a large number of picnic parties, and the necessary assignment of grounds must be made for each in order to prevent conflicts between them; order and decency at the swimming pools require enforcement; fires must be prevented or put out; the blossoming shrubs and wild animals protected; and the speed rules enforced. This requires constant and vigilant attention on the part of the officers employed.

L. R. GRABILL,

*Assistant Engineer, Rock Creek Park.*

The ENGINEER COMMISSIONER,

*Secretary, Board of Control, Rock Creek Park.*

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#### REPORT OF SUPERINTENDENT OF STABLES.

WASHINGTON, D. C., October 3, 1917.

SIR: I have the honor to submit the following report showing the operation of the stables under the care of the superintendent of stables, engineer department, District of Columbia, for the fiscal year ended June 30, 1917.

#### LIST OF FIVE STATEMENTS ATTACHED.

1. Location of stables and departments using same.
2. Number of employees and departments to which assigned.
3. Number of horses, mules, vehicles, and harness, and departments to which assigned.
4. Average cost of upkeep of horses.

Congress in making appropriations for the District of Columbia does not provide funds for the operation and maintenance of the engineer stables, except to the extent of designating and making provision for several annual employees. This, therefore, necessitates the superintendent requesting the several heads of the departments to annually make allotment to the superintendent on a pro rata basis from appropriations designated by said head for the maintenance of the stables. This method, how-

ever, was revised by the assistant to the engineer commissioner, District of Columbia, and last year witnessed the inauguration of his simplified plan whereby funds were acquired with which to operate the stables, the same being as follows: (1) Overhead charges, or transportation for the assistants to the engineer commissioner, District of Columbia; (2) departmental charges; and (3) quarterly requisitions on departments for forage and other supplies. Since this system has been in force it has proved entirely satisfactory as well as greatly diminishing the number of papers handled.

It is recommended on account of its value as a pasture, that the Commissioners continue to retain control of the land in Rock Creek Park some time ago courteously loaned to them by the board of control of that park for that purpose. This tract has now attained a high state of cultivation for grazing, and in view of the fact that animals in order to be kept in the best physical condition should have a certain period of rest each year, it is aimed to so treat them, and for this purpose we have available the above farm, where they are free from work, shoes, and harness and may roam as they see fit. Several other departments of the District owning horses, appreciating the value of such a place, take advantage thereof.

Respectfully,

J. W. BEALE,  
Superintendent of Stables.

The ENGINEER COMMISSIONER.

STATEMENT No. 1.—*Location of stables and departments using same.*

1. *First and Canal Streets SW.*—Disbursing officer; plumbing inspector; sewer department; surface division (part); surveyor; weights, measures, and markets.

2. *U Street stables, U Street between Sixteenth and Seventeenth Streets NW.*—Municipal architect, repair shop, surface division (part), engineer commissioner and assistants.

STATEMENT No. 2.—*Number of employees and departments to which assigned.*

	Employees.					
	Annual.			Per diem.		
	Blacksmiths.	Drivers.	Watchmen.	Drivers.	Stablemen.	Watchmen.
All.			3		3	1
Engineer commissioner and assistants				12		
Municipal architect				1		
Plumbing inspector				1		
Repair shop				8		
Sewer department				28		
Surface division	1			25		
Surveyor				2		
Weights, measures, and markets		1				

STATEMENT No. 3.—*Number of horses, mules, vehicles, and departments to which assigned.*

	Horses.	Mules.	Vehicles.	Harness (sets).
Disbursing office	1		1	1
Electrical department	1		1	1
Municipal architect	1		1	1
Plumbing inspector	1		1	1
Repair shop	13	3	10	8
Sewer department	10	27	40	36
Surface division	18	13	30	33
Surveyor	2		2	2
Weights, measures, and markets	4		4	4
Emergency	2		2	2

Horses	.....	53
Mules	.....	43

Total..... 96

NOTE.—Four horses transferred to Occoquan, Va., and 3 sold; 4 mules purchased and 3 horses purchased.

STATEMENT No. 4.—*Average cost of upkeep of horses during fiscal year 1917.*

Forage (allowance for 1 horse for 1 month):	
100 pounds rye straw, straight, No. 2, at \$0.847 per 100 pounds.....	\$0.84
210 pounds long timothy hay, at \$1.048 per 100 pounds.....	2.20
210 pounds mixed clover hay, at \$1.028 per 100 pounds.....	2.16
384 pounds oats, at \$2.274 per 100 pounds.....	8.73
50 pounds bran, at \$1.74 per 100 pounds.....	.87
Total cost of forage for 1 horse per month.....	14.80
Forage for 1 horse for 1 year.....	177.60
Shoos, 80 cents per month.....	9.60
Total.....	187.20

## REPORT OF SUPERINTENDENT OF THE DISTRICT BUILDING.

WASHINGTON, D. C., September 25, 1917.

GENTLEMEN: I have the honor to submit the following report on the care of the District Building for the fiscal year ended June 30, 1917:

The routine work incident to the care of the District Building involves several distinct functions, viz, the power plant; woodworking, paint, and electrical shops; blue-print and photo shop; printing shop; and the elevator, watch, and cleaning forces.

The tons of coal consumed were 1,860, an increase of 126 tons over the quantity consumed in the previous year. This was due to the inferior grade of coal supplied, some of which ran 20 per cent ash. The total kilowatt-hours of current generated was 468,420, of which 328,790 were consumed in lighting and 139,630 for power; 32,054 kilowatt-hours of the latter amount was consumed by the electrical department. The heating system was in operation nine months; the ventilating system was in operation eight months; the refrigerating system was changed from the absorption to the compression system, and two expansion coils for cold-water tank were renewed. The service heater for hot water was changed from live steam to exhaust steam, developing a considerable saving. Four hundred and forty-six cubic yards of ash were removed at a cost of \$158.74. The efficiency of the plant has been maintained by making other minor repairs.

Numerous jobs of woodworking and painting have been done, such as renewal of doors, sash, and floors, due to age and wear; the installation of partitions, railing, etc. Partition walls have been removed and doors installed for the convenience of departments. Numerous rooms have been partly or wholly painted.

The elevators and electric appliances, including fans, tube system, lighting, batteries, etc., have been efficiently operated; 25 fixtures have been changed from the direct to the semidirect illumination.

One thousand and fifty-one orders for blue prints were completed at a cost of \$1,160.70. One hundred and seventy-two orders for photographs were completed at a cost of \$600.60.

Six hundred and twenty orders for printing for various departments were completed at a cost of \$4,772.51. The reasonable cost of work turned out and the prompt execution of orders probably accounts for the continued increase in orders.

The pneumatic-tube system was in operation 2,087 hours and was out of operation one week on account of repairs to the motor.

The drinking fountains were equipped with new regulating and self-closing valves.

One hundred and five thousand and forty pounds of waste paper were baled and delivered to the contractor for the sum of \$273.11.

A deficiency appropriation of \$6,000 was made, primarily for the purchase of coal.

Fifteen thousand three hundred and seventy-nine towels were laundered at a cost of \$177.27.

J. J. LOVING,  
Major, Corps of Engineers, United States Army,  
Superintendent District Building.

The COMMISSIONERS OF THE DISTRICT OF COLUMBIA  
(Through the Engineer Commissioner).

## REPORT OF THE BOARD FOR THE CONDEMNATION OF INSANITARY BUILDINGS.

GENTLEMEN: We have the honor to submit the following report of the transactions of the board for the condemnation of insanitary buildings for the year ended June 30, 1917:

*Buildings on which action was taken in response to the notice for the year ended June 30, 1917.*

	Demolished.	Repaired.	Pending.
Buildings in alleys.....	12	20	12
Buildings in streets.....	30	35	17

*Buildings acted upon since the creation of the board for the condemnation of insanitary buildings up to and including June 30, 1917.*

	Examined.	Demolished.	Repaired.	Pending.
Buildings in alleys.....	3,924	676	520	5
Buildings in streets.....	2,785	1,406	1,072	35
Total.....	6,709	2,082	1,592	17

Total number of meetings of the board for the condemnation of insanitary buildings for the year ended June 30, 1917.....	5
Preliminary notices served .....	35
Condemnation notices served .....	8
Condemnation signs affixed to buildings .....	8
Inspections and miscellaneous visits made in connection with the service of notices.....	1,762
Cases referred to other departments for appropriate action.....	128
Estimated number of tenants required to secure other living quarters through action on the part of the board for the condemnation of insanitary buildings for the year ended June 30, 1917 .....	75
Estimated number of tenants required to secure other living quarters through the action on the part of the board for the condemnation of insanitary buildings since the creation of the board.....	6,022
Total number of tenants benefited by repairs for the year ended June 30, 1917..	150
Total number of tenants benefited by repairs since the creation of the board....	5,266
Number of cases referred to the corporation counsel for appropriate action.....	5

Repairs have been made to a number of buildings, both in alleys and streets, through informal requests of the board by many owners and agents for which no notices were served and consequently no record was kept by the board.

J. J. LOVING,  
Major, Corps of Engineers, United States Army.  
Assistant to the Engineer Commissioner,  
Wm. C. WOODWARD, M. D.,  
Health Officer, District of Columbia,  
MORRIS HACKER,  
Inspector of Buildings, District of Columbia,  
Board for the Condemnation of Insanitary Buildings.

To the COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

## APPENDIX.

## SPECIFICATIONS FOR PAVING STREETS AND AVENUES WITH SHEET ASPHALT AND ASPHALT BLOCK.

1. *Work.*—The work to be done under this proposal and contract will consist of paving with sheet asphalt or asphalt block such streets, avenues, and roads in the District of Columbia, or parts thereof, or doing any portion of such work, as may be ordered in writing by the Commissioners of the District of Columbia under appropriations for the fiscal year ending June 30, 1918.

A list of streets expected to be paved under this contract will be furnished on application. In case the price bid justifies such action, the commissioners reserve the right to add streets to this list. The commissioners also reserve the right to regulate the order in which the work shall be executed, as may appear most advantageous to the District. All work under the contract must be completed prior to June 30, 1918, unless authorized by the Engineer Commissioner to be completed at a later date.

2. *Amount of work.*—The estimated amount of this work is as follows:

	Sq. yds.
Standard sheet-asphalt pavement on concrete base.....	68,000
Vitrified block gutters on concrete base.....	4,600
Asphalt block.....	27,000

These amounts are approximations only and may be considerably varied from; but they will be used in canvassing bids and the awards will be based thereon. Bids will be scheduled on the basis of the prices named for pavements with a 6-inch concrete base, but the prices named for a 5-inch base will be incorporated in the contract and such work as may be so directed will be executed and paid for as such.

3. *Bids.*—The contractor will, for the prices bid, do all the work prescribed in these specifications: do all the necessary grading and trimming of the roadbed and all rolling; provide bridges, fences, and other means of maintaining travel on intersecting streets, roads, and railroads, and all private driveways after giving due notice to parties affected thereby; maintain the same in good and safe condition as long as may be necessary, and then remove such temporary expedients and restore such roads to their proper condition; provide watchmen, lights, fences, and other precautionary measures necessary to the protection of person and property; furnish all materials (except as specified), and all tools and implements, labor, and transportation required to lay and put in complete order for use the specified pavement; and do each and all of these to the satisfaction of the engineer. Upon the completion of the work he will remove any temporary structures erected during the progress of the work, and restore all fixtures, pavements, and parkings, both public and private, to satisfactory condition.

4. *Old material.*—Old material removed from the streets will be the property of the District of Columbia and the work of removal will be paid for at prices named in paragraph 14 of these specifications. Granite blocks, cobble, old curb, etc., must be removed to the nearest property yard or to such other places as the engineer may direct.

5. *Grading and subgrade.*—Lines and grades will be established by the engineer, and no work will be commenced until these are given. The area over which the pavement is to be laid must be excavated to the proper depth below the surface of the pavement when completed, any objectionable or unsuitable matter below the bed being removed to such depth as may be directed by the engineer and the space filled with suitable material thoroughly compacted. The bed, after being trimmed so as to be parallel to the surface of the pavement when completed, will be thoroughly compacted by rolling, with a roller weighing not less than 5 tons and by heavy ramming at places which can not be reached by the roller, dampening the bed before rolling and ramming, if required to the satisfaction of the engineer. No extra allowance will be made for trimming or rolling, but the volume of earth, etc., removed will be paid for as grading of its class. Any filling will be done in layers not exceeding 12 inches in thickness, and all materials used for this purpose will be subject to approval. If improper or unsuitable material be used, it will be removed at the cost of the contractor. All measurements will be made in place, and payments made thereon. Should the grading involve work in both "cut" and "fill," the measurement of it will be computed on the basis of the volume of the material in place in the "cut" only; the excavated material from the "cut" section deposited in the "fill," will not be again paid for as "fill." Should the amount of cut on the street not suffice to make the necessary fill, the amount borrowed from other designated localities will be paid for as grading.

*6. Six-inch concrete base.*—Upon the bed prepared as described in paragraph 5 there will be laid 6-inch foundations of concrete as directed, made of the following materials by volume:

One part Portland cement, 3 parts sand, 7 parts gravel.

Broken stone, run of the crusher, may be substituted for part or all of the gravel at the option of the contractor.

(a) *Cement.*—The cement used will be a standard brand of Portland cement, uninjured by age or exposure, and delivered at the work in original undamaged packages. The right is reserved to reject any cement that has not established itself as a high-grade Portland cement and has not been made by the same mill for two years and given satisfaction in use for at least one year under climatic and other conditions of at least equal severity as those of the work proposed. The contractor shall keep the cement in store, under proper cover, in the city of Washington, and shall properly protect it until used. The engineer shall have the right to test the cement as he judges necessary and to reject any or all lots. The cement, after being accepted, can not be transferred or used by the contractor on other work without the consent of the engineer commissioner. The cement while in storage or upon the work or while being hauled upon the work, shall be properly protected, and no cement shall be used which, in the opinion of the engineer, has been injured by age or exposure.

No cement shall be used upon the work until it has been tested in the office of the engineer commissioner and accepted by him, the tests to extend over such length of time not exceeding 28 days as the engineer commissioner may think necessary.

Cement furnished by the contractor that has been tested and accepted by the Bureau of Standards and that is identified as such will be subject only to the following retests by the District of Columbia: Firmness, initial set, hard set, 24-hour tensile.

(b) *Sand.*—The sand used shall be clean, sharp river or pit sand, containing both fine and coarse grains, but free from sewage, mud, clay, mica, paper, leaves, chips, or other foreign matter, and not showing when shaken with water, and after subsidence more than 5 per cent by volume, of silt.

(c) *Broken stone.*—Stone used in concrete must be hard, durable, and properly broken to a size small enough to pass through a ring 2 inches in diameter when the run of the crusher is substituted for gravel. The run of the crusher shall not contain over 1 per cent of material passing a No. 10 sieve. The stone shall be thoroughly cleansed from all foreign substance, and shall be screened and washed, if so ordered by the engineer. Sand, detritus, or any material other than hard, angular fragments of stone will be considered foreign substances.

(d) *Gravel.*—Gravel shall be clean, washed gravel, and shall not contain pebbles greater than 2 inches in their largest dimensions, and shall run from that down to pea size, well graduated.

(e) *Water.*—Water used for mortar and concrete shall be fresh and clean, free from earth, dirt, or sewage, and shall be used in such quantity as the engineer may direct.

(f) *Platforms.*—Platforms shall be provided if so ordered by the engineer upon which all sand, gravel, and broken stone for concrete shall be placed when brought upon the line of work, and kept there until used.

(g) *Mixing.*—The thorough mixing and incorporation of all material will be insisted upon. If done by hand labor the dry cement and sand shall be turned over and mixed with shovels by skilled workmen not less than six times before the water is added; the stone or gravel, after being drenched with water, shall be added to the mixed sand and cement; the drenching shall not be done while the stone or gravel is in the wheelbarrow; the whole mass shall be thoroughly turned over with shovels, not less than four times, and mixed upon a water-tight platform until every particle of stone or gravel is completely enveloped with mortar. The whole operation of mixing and laying each batch shall be performed as expeditiously as possible, by the aid of machinery, or a sufficient number of skilled men. If the concrete is mixed in batches requiring one barrel of cement, the platform must not be smaller than 10 feet by 12 feet, nor will a larger amount of concrete than can be made with one barrel of cement be allowed to be mixed in one batch by hand. In mixing by machinery the materials must be so delivered as to insure a uniform product of the specified proportions of all ingredients to the satisfaction of the engineer.

(h) *Setting.*—Concrete shall not be used after it has begun to show evidence of setting. No concrete which has once set shall be used as material for mixing a new batch.

Each batch of concrete after being mixed shall be spread in place in horizontal layers by means of shovels so as to give the requisite thickness after being tamped, and shall then be thoroughly compacted. Any evidence of lack of compaction will be regarded as sufficient reasons for removal and replacement of the base. Hauling over base less than three days old will not be allowed unless planks are laid.

7. *Five-inch concrete base.*—All provisions of the specifications for a 6-inch concrete base shall apply to a 5-inch concrete base which shall differ from the 6-inch base only in respect to the thickness thereof and the price paid therefor.

#### SHEET-ASPHALT PAVEMENT.

8. *Asphalt binder.*—The binder course shall be composed of broken stone, equal in quality to the stone specified for concrete base, its largest dimension passing an inch-and-a-quarter screen, and the stone, after passing the heating drums, shall not contain less than 5 nor more than 15 per cent of material passing a No. 10 screen.

The stone will be heated not higher than 350° F., in suitable appliances. It is then to be thoroughly mixed by machinery with asphalt cement, such as is acceptable for surface cement, penetration 50 to 80, at such temperature and in such proportions that the resulting binder will have life and gloss without an excess of cement. Should it appear dull from overheating or lack of cement, it will be rejected. While hot it will be hauled upon the work, spread upon the base so that when compacted it will be at least 1½ inches in thickness, and immediately rammed and rolled until it is cold. Should the resulting course not show a proper bond, it must be immediately removed and replaced by and at the expense of the contractor. Binder and top shall not be taken from the yard to the site of the work, when in the judgment of the engineer weather conditions are unsuitable for the work of laying the pavement.

The contractor shall not enter upon a concrete base in order to lay the binder course until it has obtained sufficient strength for such a purpose, and during the period between laying the base and binder he shall properly protect it, and, when ordered by the engineer, shall sprinkle it in warm weather between the hours of sunrise and sunset as often as may be deemed necessary, and in cold weather cover it with a material suitable for its protection.

9. *Asphalt wearing surface.*—The wearing surface of the pavement shall be composed of asphalt cement (refined asphalt and asphaltic flux); clean, sharp-grained sand; fine absorbent mineral dust.

(a) *Asphalt.*—The asphalt shall be refined until homogeneous and free from water and shall not at any time be heated to a temperature high enough to injure it, and 100 parts of the refined product shall require not more than 30 parts of flux to produce the asphalt cement described in paragraph 9-c.

The asphalt for class (a) work shall conform to such tests as will establish its identity as a product of the refinement of a natural crude asphalt without the admixture of any other material.

The refined asphalt for class (b) work shall be the product of refinement of an unadulterated natural asphaltic oil, and shall contain, after refinement, not less than 90 per cent of bitumen soluble in carbon bisulphide.

(b) *Asphaltic flux.*—The flux used in the manufacture of asphalt cement shall be an asphalt oil from which the lighter oils have been removed by distillation without cracking, until the flux has the following characteristics: Free from water and foreign matter; flash point, not less than 300° F.; distillate at 400° for 18 hours, less than 10 per cent; the flash point shall be taken in New York State closed oil tester. The distillate shall be made with about 50 grams of flux in a small glass retort, provided with a thermometer and placed in a copper holder. The residue in the retort, after distilling, must be free from coke. Any other softening agents approved by the engineer commissioner, may be used in place of asphaltic flux.

(c) *Asphalt cement.*—The asphalt cement must be of refined asphalt, fluxed when necessary with asphaltic oil, refined maltha, or other approved flux. The cement must be practically free from water and must be within the range of 40 to 70 penetration when tested at 77° F. on Dow penetration machine with No. 2 needle, 100 grams, 5 seconds. The degree of penetration to be fixed by the engineer commissioner.

Preference will be given to an asphalt cement that is not readily affected by water, provided it is satisfactory in other respects. The use of an asphalt under these specifications shall be subject to the approval of the engineer commissioner, and if an asphalt has been proposed for use by the contractor and approved by the engineer commissioner no change in the asphalt to be used shall be made unless with the approval of the engineer commissioner. If an asphalt or flux is submitted for use which has not been successfully used for a period of at least two years for paving under conditions similar to those existing in the District of Columbia, its use may be limited to such extent as may be deemed advisable, or it may be rejected for use entirely, in the discretion of the engineer commissioner.

The asphalt cement must comply with the following tests:

1. It must be of such consistency that when tested at 32° F. it will not show a hardness below 10 penetration, and when tested at 115° F. it will not be softer than 350 penetration.

2. When a briquet of the cement having a minimum cross section of one square centimeter, having a penetration of 50° to 53° at 77° F. is tested for ductility at 77° F., the bitumen must stretch at the rate of 5 centimeters per minute to a distance of 25 centimeters before breaking.

3. When the cement is heated in an open tin box  $\frac{1}{4}$  inch deep by 2 $\frac{1}{2}$  inches in diameter at a temperature of 300° F. for seven hours in a hot-air oven, it must not show a loss by volatilization of over 5 per cent and must not have been hardened over 30 per cent by this heating.

The asphalt cement must never be heated to a temperature that will injure it.

When the asphalt cement contains over 5 per cent of material that will separate by subsidence while in a molten condition, it must be thoroughly agitated before drawing from storage and while in use in the supply kettles, so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, as adopted in the office of the engineer commissioner.

(d) *Sand*.—The sand to be used shall be free from mud, hard grained, and moderately sharp. On sifting, it should have at least 15 per cent of material that would be caught on a 40-mesh per inch screen, 25 per cent of material that will pass on 80-mesh to an inch screen, and 10 per cent at least must pass a 100-mesh to an inch screen. If the sand to be used does not contain the desired fine material, mineral dust may be added to make up the deficiency, and in any case at least 5 per cent of such mineral dust shall be used. The amount of fine material may be increased, at the discretion of the engineer commissioner.

(e) *Mineral dust*.—This shall be any fine Portland cement or limestone dust, the whole of which shall pass a 30-mesh screen and at least 85 per cent pass a 100-mesh screen.

(f) *Asphalt paving material*.—The materials complying with the above specifications shall be mixed in proportion by weight depending upon their character and the traffic on the street, and upon the character of the asphalt, and will be determined by the engineer commissioner, but the percentage of bitumen in any mixture soluble in carbon disulphide shall not be less than 9 nor more than 13 per cent. If the proportions of the mixture are varied in any manner from those specified the mixture will be condemned; its use will not be permitted; and, if already placed on the streets, it must be removed and replaced by proper materials at the expense of the contractor.

The sand or the mixture of sand and stone dust, and the asphalt cement, will be heated separately to about 300° F. The dust, if limestone, will be mixed while cold with the hot sand in the required proportions and then mixed with the asphalt cement at the required temperature, and in the proper proportion in a suitable apparatus, so as to effect a thoroughly homogeneous mixture. Sand boxes and asphalt gauges will be weighed in the presence of inspectors as often as may be desired.

Samples of all material entering into the composition of the pavement shall be supplied to the inspector of asphalt and cements when required, in suitable tin boxes and cans; he shall have access to all branches of the works at any time, and shall have the right to obtain samples of all materials from the source of supply.

(g) *Laying asphalt surface*.—The asphalt paving mixture, prepared in the manner described, will be hauled to the site of the work at a temperature of not less than 250° or more than 350° F. in trucks or wagons, canvas covers being provided for use in transit. It will then be shoveled into place and thoroughly spread to a thickness of at least 2 $\frac{1}{2}$  inches by means of hot iron rakes, in such manner as to give uniform and regular grade, so that, after having received its ultimate compression, it will have a net thickness of at least 1 $\frac{1}{2}$  inches. This depth will be constantly tested by means of gauges furnished by the engineer commissioner. The surface will then be compressed by steam rollers. First with a roller weighing not less than 2 $\frac{1}{2}$  tons, after which a small amount of hydraulic cement will be swept over it and will then be thoroughly compressed by a steam roller weighing not less than 10 tons, the rolling being continued for not less than five hours for every 1,000 yards of surface. The street to be barricaded, the barricades to remain for such length of time as deemed necessary by the engineer commissioner. Binder or topping shall not be laid when in the judgment of the engineer weather conditions are unsuitable for the work of laying the pavement. The surfaces on which they are laid must be cleaned to the satisfaction of the engineer so that good adhesion of the binder to the base and of top mixture to the under may be secured.

10. *Laying vitrified blocks*.—Vitrified-block gutters will ordinarily be 13 $\frac{1}{2}$  inches wide, laid on a concrete base 6 inches in depth, of the same material and proportions and laid in the same manner as prescribed in these specifications for the concrete base under asphalt pavements.

As soon as practicable after the concrete base has been laid, a dry mixture, composed of four parts of the sand specified in paragraph 6-b, and one part of Portland

cement, thoroughly mixed, will be spread thereon to the depth of not less than one-half inch, as a bed for the paving blocks, and regulated so as to be exactly parallel to the finished grade of the gutter.

On the bed thus prepared for them the blocks will be set on edge, with the longest dimensions at right angles to the curb, or as directed by the engineer.

The longitudinal joints of each course of blocks laid must be broken by a lap of not less than 4 inches.

The blocks will then be carefully rammed by placing a plank over several courses and ramming the plank with a heavy rammer. The ramming will be continued until the blocks reach a firm, unyielding bed and present a uniform surface, with proper grade. Any lack of uniformity in the surface or defect in the grade must be corrected by taking up and relaying the blocks.

After proper ramming the entire gutter will be thoroughly grouted with a thin, easily flowing grout, of neat Portland cement.

A similar construction of block to that described for gutters may be used adjacent to railroad tracks; the base will in that case extend to the bottom of the crossties, or at least 6 inches thick.

The blocks will be furnished the contractor at the District property yards, and must be hauled to the work at his expense.

#### ASPHALT-BLOCK PAVEMENT.

11. *Asphalt blocks*.—The size of the blocks will be 2 by 5 by 12 inches, and a variation of  $\frac{1}{2}$  inch from these dimensions will be sufficient ground for rejecting any block.

All bids must be accompanied by a specimen block of the size and quality described in these specifications, labeled with the name of the bidder and locality of the factory. Bids not accompanied by specimen blocks will not be accepted. The blocks will be tested for specific gravity which shall not be less than 2.400 and all blocks furnished must be equal in quality to the sample, as determined by the engineer commissioner.

The blocks to be composed of asphalt cement (refined asphalt and asphaltic flux); mineral dust; crushed stone.

(a) *Asphalt*.—The asphalt shall be refined until homogeneous and free from water and shall not at any time be heated to a temperature high enough to injure it. The refined product shall contain at least 50 per cent of bitumen soluble in carbon bisulphide and 100 parts shall not require more than 30 parts of the flux to produce the asphalt cement described in paragraph 9—c.

(b) *Asphaltic flux*.—The flux used in the manufacture of asphalt cement shall be an asphaltic oil from which the lighter oils have been removed by distillation without cracking, until the flux has the following characteristics: Free from water and foreign matter; flash point not less than 300° F.; distillate at 400° for 18 hours, less than 10 per cent; the flash point shall be taken in a New York State closed oil tester. The distillate shall be made with about 50 grams of flux in a small glass retort, provided with a thermometer and placed in a copper holder. The residue in the retort, after distilling, must be free from coke. Any other softening agent approved by the engineer commissioner, may be used in place of asphaltic flux.

(c) *Asphalt cement*.—The asphalt cement must be practically free from water and shall not at any time reach a temperature high enough to injure it.

If an asphalt is accepted that is readily affected by water some provision satisfactory to the engineer commissioner must be made to guard against the results of such action, and such work must be included in the price bid.

The asphalt cement must comply with the following requirements and must in any case be subject to the approval of the engineer commissioner.

1. For the purpose of testing the asphalt cement having a penetration of 20° to 23° at 77° F. on the Dow penetration machine with a No. 2 needle, 100 grams, 5 seconds, its composition shall be so regulated by the addition, if necessary, of standard fine mineral dust; it will contain 50 per cent of bitumen soluble in carbon bisulphide.

This cement shall be so tough at 32° F. that a prism 1 centimeter square by 8 centimeters long between supports will not break under impact at center with less than 15 centimeters drop of a 25 gram weight striking a vertical plunger having a horizontal face of 1 centimeter by 1 millimeter resting on the asphalt prism.

2. Degree of penetration of the asphalt cement to be fixed by the engineer commissioner.

3. When the cement is heated in an open tin box  $\frac{1}{2}$  inch deep by  $2\frac{1}{2}$  inches in diameter at a temperature of 300° F. for seven hours in a hot-air oven it must not show a loss by volatilization of over 5 per cent and it must not have been hardened over 30 per cent by this heating.

The asphalt cement must never be heated to a temperature that will injure it.

When the asphalt cement contains over 5 per cent of material that will separate by subsidence while in a molten condition it must be thoroughly agitated before drawing from storage and while in use in the supply kettles so as to insure a uniform cement.

These properties shall be determined by tests made by uniform methods, as adopted in the office of the engineer commissioner.

(d) *Mineral dust.*—This shall be any fine Portland cement or limestone dust, the whole of which shall pass a 30-mesh screen, and at least 85 per cent pass a 100-mesh screen.

(c) *Crushed stone.*—The crushed stone in use shall be from any tough, hard rock, and shall not contain any appreciable amount of soft ingredients, such as mica, soft sandstone or shale. On sifting not more than 3 per cent shall be retained on a 4-mesh per inch screen; at least 40 per cent must be retained on 20-mesh per inch screen, and at least 12 per cent must pass a 100-mesh per inch screen. If the stone does not contain the desired fine material, mineral dust may be added to make up the deficiency, and in any case at least 5 per cent of such mineral dust shall be used.

(f) *Manufacture.*—The materials complying with the above specifications shall be mixed in proportions by weight, depending upon their character, which will be determined by the engineer commissioner, but in any mixture the percentage of bitumen soluble in carbon bisulphide shall not exceed the limits, 6 to 9 per cent.

If the proportions of the mixture are varied in any manner from those prescribed, the blocks will not be accepted.

The stone and dust and the asphaltic cement must be mixed while hot, and the mixture must be compressed into blocks by methods meeting with the approval of the engineer commissioner.

Samples of all material entering into the composition of the block shall be furnished when required, in suitable tin boxes and cans, to the inspector of asphalt and cements, who shall have access to all branches of the works at all times.

Blocks are to be manufactured with a total minimum compression of not less than 360,000 pounds per block, press pressure, and shall have a specific gravity of not less than 2.400.

12. *Method of laying blocks on concrete base.*—The two-inch blocks are to be laid on this concrete base in a paving bed of one part Portland cement and four parts sand, at least one-half inch thick, and as much thicker as may be necessary, due to inequalities in surface of concrete base, so that the blocks when tamped in place, will be securely imbedded in this paving bed and wholly supported by it, and will present a uniform surface with close joints and proper grade and crown. The pavement will then be thoroughly grouted with a thin easily flowing grout of one part neat Portland cement and one part fine sand.

13. *Additional work.*—The following specifications will cover incidental work which may be required of the contractor:

(a) *Setting 6 by 20 inch granite and bluestone curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 24 inches below the top of the curb when set, and 20 inches wide, will be excavated to receive the curb and its gravel bed, the dimensions of the trench, in width, will be 14 inches from the curb line toward the building line of the street, and 6 inches from said curb line toward the center line of the street. In the trench thus prepared the curb will be set, and brought to line and grade, with plumb face. Spalls of stone, hard-burned brick or other acceptable substance prepared for the purpose, will be used to adjust the curb to grade, and these spalls will be so placed and adjusted as to support the curbing permanently, and afford a firm and stable support for it, without the use of small chips and fragments, used as "shimming" pieces, to wedge the stone in place. After the curb has been properly placed, and adjusted to line and grade, the trench will be filled with gravel of approved quality, to within 8 inches of the top of the curb, the filling to be done in layers of not more than 3 inches in depth, and thoroughly compacted by a suitable ramming. Close contact joints and even surfaces must be made, and the lines and grades furnished strictly followed.

(b) *Setting 8 by 8 inch granite curb.*—This curb will be set in the following manner: A trench parallel to the curb line, having a depth of 15 inches below the top of the curb when set, and 18 inches wide, will be excavated to receive the concrete and the curb. The dimensions of the trench in width will be 14 inches from the curb line toward the building and 4 inches from the curb line toward the center line of the street. In this trench thus prepared a bed of concrete, composed of one part of Portland cement, four parts of clean concrete sand, and ten parts of screen pebbles, will be laid, filling the trench to a depth of 5 inches, the material to be mixed and laid under the same conditions as prescribed for laying cement concrete base for sheet asphalt pavements. On the base prepared and laid as above, the curb will be placed before the concrete has set, and adjusted to line and grade by setting it to a firm, unyielding bearing in a bed of freshly made concrete, by the use of heavy wooden

mauls. The face of the curb must be plumb and true to line, and the top of it carefully set to grade with close and even contact joints. After the curb has been set to line and grade, the trench on the footwalk side will be immediately filled with concrete to within 5 inches of the top of the curb, which will be thoroughly rammed and compacted, after which it will immediately be covered with earth to prevent injury to it through too rapid evaporation, etc. In case vitrified block gutters are to be laid in front of the curb, any portion of the concrete base of the curb that would interfere with the laying of such gutters must be removed immediately after the curb is set.

(c) *Resetting 6 by 20 inch granite and bluestone curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except no hauling of curb is required other than that incidental to the necessary disposition of it upon the line of the work. Under this classification also, the curb may be adjusted to line and grade without removing it from its trench, if so ordered by the engineer.

(d) *Resetting 8 by 8 inch granite curb.*—The work to be done under this classification is identical with that specified for setting this class of curb, except that no hauling of the curb is required other than that incidental to the necessary disposition of it upon the line of work, and no new concrete is required other than that sufficient to imbed the stone and back and adjust it to line and grade.

(e) *General instructions.*—All curb will be furnished to the contractor at the District property yard and will be hauled by him to the site of the work; any curbing unaccounted for, or improperly disposed of, or damaged or broken, through careless or unskilled handling, will be charged against him, the value of the loss to the District will be deducted from any amount due the contractor for work done, as determined by the engineer.

All expenses connected with or incidental to the work of setting or resetting curb, as described above, including the hauling of the curbing, preparing the curb trenches, and the necessary grading connected therewith, furnishing gravel and spalls, furnishing and placing concrete, and all other material and labor necessary to execute the work in accordance with the specifications therefor, are included in the fixed price for the respective items as hereinafter stated. The cost of dressing, jointing, or cutting the curb will be paid for additionally, but no other claim for additional compensation will be entertained. Should the adjoining brick footwalks be disturbed in order to set or reset the curb the portion so disturbed shall be repaved, if required by the engineer, without cost to the District.

14. *Prices for additional work.*—Contractors must do such additional work incident to the construction of new pavements as may be ordered on each street by the engineering commissioner. All such work shall be in accordance with current District specifications. Prices paid for this work will be as stated below:

- (1) Removing old curb, including haul not to exceed 2 miles, 12 cents per linear foot.
- (2) Hauling same beyond distance of 2 miles, 1 cent per linear foot per mile.
- (3) Hauling from District property yard and setting 6 by 20 inch curb, 25 cents per linear foot.
- (4) Resetting 6 by 20 inch granite and bluestone curb, 25 cents per linear foot.
- (5) Hauling from District property yard and setting 8 by 8 inch curb, 35 cents per linear foot.
- (6) Resetting 8 by 8 inch curb on new concrete base, 31 cents per linear foot.
- (7) Resetting 8 by 8 inch curb on old concrete base, 20 cents per linear foot.
- (8) Dressing, jointing, and cutting curb, etc. (stonecutter's time), including setting-up labor, 75 cents per hour.
- (9) Removing old rubble, cobble, flagging stone, and brick, vitrified block or brick, etc., including haul not to exceed 2 miles, 18 cents per square yard.
- (10) Removing old asphalt blocks, including haul not to exceed 2 miles, 23 cents per square yard.
- (11) Removing old granite block, including haul not to exceed 2 miles, and removal of old paving bed and cleaning concrete base where same exists, 30 cents per square yard.
- (12) Overhaul on items 9, 10, and 11, 2 cents per square yard per quarter mile or fraction thereof.
- (13) Removing old coal-tar or asphalt surface and binder from concrete base in connection with resurfacing work, including haul, 14 cents per square yard.
- (14) Grading and hauling earth, not to exceed 1,000 feet, 65 cents per cubic yard.
- (15) Grading and hauling macadam not to exceed 1,000 feet, 65 cents per cubic yard.

- (16) Removing old coal-tar and bituminous pavements or base of the class laid since 1880 and hauling not to exceed 1,000 feet, \$1 per cubic yard.
- (17) Removing old coal-tar and bituminous pavement or base of the class laid prior to 1880 and hauling same not to exceed 1,000 feet, \$1.85 per cubic yard.
- (18) Removing old concrete base and hauling not to exceed 1,000 feet, \$1.60 per cubic yard.
- (19) Hauling excavated material, per 100 feet, over first 1,000 feet,  $1\frac{1}{4}$  cents per cubic yard.
- (20) Laying or relaying vitrified brick or block on old concrete base, 70 cents per square yard.
- (21) Laying vitrified block on new concrete base in connection with asphalt block pavement, \$1.40 per square yard.
- (22) Laying or relaying asphalt block and vitrified brick or block on gravel base, 45 cents per square yard.
- (23) Cleaning old vitrified brick or block for relaying, 25 cents per square yard.
- (24) Laying and relaying granite block, 75 cents per square yard.
- (25) Relaying cobble and rubble, 40 cents per square yard.
- (26) Repairing cement walks, including haul, \$1.50 per square yard.
- (27) Repairing brick walks, 25 cents per square yard.
- (28) Laying Portland cement concrete base in place, \$5.40 per cubic yard.
- (29) Adjusting manhole tops and basin covers to grade, \$1.50 each.
- (30) Adjusting water-valve casings to grade, \$3 each.
- (31) Asphaltic top, 47 cents per cubic foot.
- (32) Asphaltic binder, 26 cents per cubic foot.
- (33) Adjusting electric light or telephone manhole tops to grade, as follows:
  - (a) Size, less than 6 square feet area, \$1 each.
  - (b) Size, over 6 and less than 16 square feet, \$2 each.
  - (c) Size, from 16 to 28 square feet, \$4 each.

15. *Extra work.*—The contractor must be prepared to do any extra work that may be ordered in writing by the engineer, and for this he will be paid at current rates for work of a similar character, or, if the extra work should be of a class for which no rate is fixed by current contracts, the actual reasonable cost to the contractor, as determined by the engineer, plus 15 per cent of said cost.

The contractor shall have no claim for compensation for extra work unless same is ordered in writing by the engineer. All additional and extra work shall conform to current District of Columbia specifications therefor.

16. *Guarantee.*—All work under this contract will be guaranteed and kept in repair by the contractor without cost to the District of Columbia for a period of one year from date of its completion as indicated on the final voucher for each street.

It is further expressly understood and agreed that if any of the pavements laid should, for any reason whatsoever, within the period of one year, prove inferior to the best laid in the District prior to July 1, 1917, then the contractor shall, on demand of the commissioners, remove such defective pavements and relay them with new material of approved quality. The engineer commissioner shall decide the question of inferiority.

On expiration of guarantee for maintenance the work is to be inspected, and all imperfections must be corrected where and to such extent as the engineer shall direct, upon which the engineer will accept the same in writing, and until such acceptance the guarantee shall be in force. Repairs that may become necessary during the guarantee period will be made by the contractor when ordered by the engineer commissioner.

If the contractor fails to make such necessary repairs after notice to do so, the commissioners may cause such work to be done and the contractor and the surety or sureties under the bond shall be jointly and severally liable for the cost of same.

17. *Cuts.*—Contractors shall be responsible for any work done upon any street over plumber's cuts or other work done by the permission of the commissioners before the work is begun.

18. *Modification.*—The commissioners reserve the right to modify these specifications as may from time to time seem desirable. The amount of compensation, if any, due the contractor for said modifications will be determined by the engineer commissioner on the same basis as in the case of extra work.

#### GENERAL STIPULATIONS.

These stipulations are part of the specifications.

1. *Bond.*—Good and sufficient bond in the penal sum equal to at least 25 per cent of the estimated amount of the contract, with sureties or a surety company satisfactory

to the commissioners, will be required from all contractors, guaranteeing that their contract will be faithfully performed; that the contractor or contractors will be responsible for all claims for damages to persons, property, or premises arising out of his or their operations prior to the acceptance of the finished work, and that he or they will promptly make payments to all persons supplying him or them with labor and materials in the prosecution of the work provided for in the contract. In the event that the sureties or surety company become unsatisfactory to the said commissioners, they may, in their discretion, require from the contractor an additional or new bond, in the same or a lesser penal sum, with sureties or a surety company satisfactory to them and to be conditioned as above required.

Upon the failure to furnish such additional or new bond within 30 days after written notice to do so, all payments under this contract will be withheld until such additional or new bond is furnished.

2. *Transfers.*—No contract or any interest therein shall be transferred by the parties to whom the award is made; such transfers will be null and void, and will cause the contract to be annulled and the work to be given to other parties under the conditions mentioned herein.

3. *Patents.*—The District of Columbia assumes all responsibility under this specification and contract as to any claim which may be made that any process prescribed in these specifications is an infringement of any patent covering pavement construction and will defend and save harmless the contractor as to any such claim or the defense thereof in the courts: *Provided, however,* That the District of Columbia shall not be liable for claims for damages or anticipated profits preferred by the contractor on account of delay, interruption, or abandonment of the work occasioned by or resulting from such claim of infringement as is above referred to. The contractor, however, will be required to hold the District of Columbia harmless against all or any claims for the use of any patented article, appliance, or process in connection with the contract herein contemplated except as related above.

4. *Contractor's risk.*—All loss or damage due to negligence, or arising out of the nature of the work to be done, or from any unforeseen or unusual obstructions or difficulties which may be encountered in the prosecution of the same, or from the action of the elements, will be sustained by the contractor.

5. *Employees.*—The contractor shall employ capable superintendents or foremen to represent him on the work, and they shall receive and obey orders from the engineer. He shall so conduct his operations as to interfere with the work of other District contractors as little as possible. The foreman, mechanics, and others employed by the contractor shall be skilled in the several parts which are given them to do.

An employee or agent of the contractor who shall use profane or abusive language to the inspector, or otherwise impede or embarrass him in the performance of his duty, or who, in the opinion of the engineer, is careless or incompetent, or obstructs the progress of the work, or disobeys or evades the instructions given by the engineer, shall be immediately discharged and not again employed without the consent of the engineer.

6. *Weather.*—The contractor shall suspend all work under the contract when notified by the engineer that the weather is unsuitable for carrying it on.

If work is allowed during cold or freezing weather, the contractor shall take such additional precautions as the engineer shall require, without additional expense, and under no circumstances shall materials be used which have been injured by the weather.

7. *Inspection.*—Inspectors may be appointed who shall have access to all parts of the work at all times and whose duty it shall be to point out to the contractor any neglect or disregard of the specifications of the contract; but the right of final rejection of the work will not be waived at any time. Upon all technical questions concerning the execution of the work, in accordance with the specifications and the measurements thereof, the decision of the engineer shall be final. Ordinarily, one inspector will be employed by the District of Columbia for each section of the work under contract; but if, on account of any apparent disregard of the specifications, additional inspectors shall be required, they will be employed by the District of Columbia, at the rate not to exceed \$6 per diem each, and the cost of same will be charged to the contractor.

8. *Condemned work.*—All materials furnished and work done not in accordance with these specifications shall be removed within 24 hours after written notice from the engineer, by and at the expense of the contractor, or, in case of failure to do so, it shall be removed by the District of Columbia and the cost thereof charged to the contractor and deducted from the amount due or which may become due him. None but the best material of the several descriptions shall be used.

9. *District material.*—No materials furnished by the District shall be applied to any other use, public or private, than that for which they are issued to the contractor. The contractor will be held responsible for all materials delivered to him upon requi-

sition, and shall be charged for all materials delivered upon said requisition. Should the amount of materials actually delivered and not properly accounted for exceed the amount used upon the work, the cost to the District of the difference must be made good by the contractor, and will be deducted from any moneys which may be due him.

Any material that is the property of the District that is not accounted for by the contractor to the satisfaction of the engineer will be charged against the contractor at the contract price for similar material.

10. *Failure.*—If the contractor shall delay or fail to commence with the delivery of the material or the performance of the work as specified herein, or shall, in the judgment of the commissioners of the District of Columbia, fail to prosecute faithfully and diligently the work in accordance with the specifications and requirements of this contract, then, in either case, the said commissioners shall have the power to annul this contract by giving notice in writing to that effect to the contractor, and, upon the giving of such notice all payments to the contractor under this contract shall cease, and all money or reserved percentage due or to become due thereunder shall be retained by the said commissioners until the final completion and acceptance of the work herein stipulated to be done; and the said commissioners shall have the right to recover from the contractor whatever sums may be expended by the District of Columbia in completing the said contract in excess of the price herein stipulated to be paid the contractor for completing the same, and also all costs of inspection and superintendence, including all necessary traveling expenses connected therewith, incurred by the said District of Columbia, in excess of those payable by the said District of Columbia during the period herein allowed for the completion of the contract by the contractor, and the said commissioners may deduct all the above-mentioned sums out of or from the money or reserved percentage retained as aforesaid; and upon the giving of the said notice the said commissioners shall be authorized to proceed to secure the performance of the work or delivery of the materials, by contract or otherwise, in accordance with law.

11. *Payments.*—Payments will be made monthly, *provided the progress of the work is satisfactory*, less 10 per cent of each estimate, to be withheld until final payment.

12. *Conveniences.*—The contractor shall provide, for use of the District inspectors, stationed at paving plant, and cement warehouse, suitable office and testing room with such plain furniture as may be necessary for the proper transaction of their business as agents for the District. They shall also furnish, when needed for use of laborers on line of work, necessary toilet conveniences secluded from public observation.

13. *Cleaning up.*—On the completion of work it shall be thoroughly cleaned before it will be accepted.

14. *Lines.*—All necessary lines and levels will be given by the engineer by means of suitable marks, and in establishing them the contractor shall provide such materials and assistance as may be required by the engineer. All marks given are to be carefully preserved and if destroyed through carelessness the cost of replacing them shall be charged against the contractor at a fixed price of \$2 for each point, to be deducted from any money found due at final settlement.

15. *Interpretation.*—Any doubt as to the meaning of these specifications will be explained by the engineer, who shall have the right to correct any errors or omissions in them when such correction is necessary for the proper fulfillment of their intention. Whenever the word "commissioners" is used in these specifications, it is understood to designate the Commissioners of the District of Columbia. Whenever the word "engineer" is used, it is understood to designate the engineer commissioner of the District of Columbia, or, in his absence, his duly authorized assistants, assistant engineers, and inspectors representing him, limited by the special duties intrusted to them.



